SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Department of Mathematics
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	1.00

2. Data about the subject

2.1	Subject name			Mathematical analysis			
2.2	Subject area			Analysis			
2.3	Course responsible/lecturer			Assist.prof. dr. Daniela Marian daniela.marian@math.utcluj.ro			
2.4	Teachers in charge of seminars			Assist.prof. dr. Daniela Marian daniela.marian@math.utcluj.ro			
2.5 Year of study	I	2.6 Semester	I	2.7 Assessment	Exam	2.8 Subject category	DF/ DI

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14
Individual study					hours
Manual, lecture material and notes, bibliography					34
Supplementary study in the library, online and in the field					8
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					10
Tutoring					3
Exams and tests					3
Other activities					

3.7	Total hours of individual study	58
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A Electronic Course
5.2	For the applications	Individual work

6. Specific competences

Professional competences	**C1.1.** Identifying the concepts, principles, basic theorems and mathematical methods, physics, chemistry, technical drawing, computer programming. **C1.2**. Using basic knowledge in the fundamental disciplines for theoretical explanation and interpretation of results, theorems, phenomena or specific processes of industrial engineering. **C1.3.** Applying the theorems, principles and basic methods of fundamental disciplines, for basic engineering calculations in design and operation of technical systems specific to industrial engineering, under qualified assistance **C1.4.** Appropriate use of standard assessment criteria and methods of fundamental disciplines for identification, modelling, analysis and qualitative and quantitative assessment of characteristics of the phenomena and parameters as well as the processing and interpretation of the results from specific industrial engineering processes. **C1.5.** Developing of specific industrial engineering projects and models based on identification, selection and use of principles, optimal methods and acknowledged solutions from the fundamental disciplines.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication..

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To obtain knowledge about the basic results of mathematical analysis and their application in other discipline
7.2	Specific objectives	• To compute partial derivatives of functions of several variables • To compute the differential of functions of several variables and vector functions • To write Taylor's formula for functions of several variables • To study the extrema of functions of several variables • To compute definite integrals, improper integrals, double integrals, triple integrals, line integrals • To know applications of mathematics in different domains

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	Differential Calculus for Real Functions of One Real Variable	Oral presentation, notes on blackboard and multimedia presentat Students are asked and	2 hours
2	Part I: Sets Endowed with different Structures (metric spaces, linear spaces, normed spaces). Real Functions. Vector Functions Part II: Differential Calculus for Real Functions of Several Variables. Partial Derivatives. Partial Derivatives of Higher Orders.		2 hours
3	Derivatives of Composite Functions. Homogeneous Functions. Directional Derivative. Differential Operators. Differentials. Differentials of Higher Orders		2 hours
4	Taylor's Formula for Real Functions of Several Variables. Differential		2 hours

	Calculus for Vector Functions.	encouraged to ask questions	
5	Implicit Functions		2 hours
6	Changes of Variables		2 hours
7	Extrema of Functions of Several Variables		2 hours
8	Antiderivatives. Riemann integrals. Applications		2 hours
9	Improper integrals		2 hours
10	The length of a curve. Line Integrals with Respect to Arc Lenght		2 hours
11	Line Integrals with Respect to Coordinates. Line Integrals Path Independent. Applications of Line Integrals		2 hours
12	Double Integrals. Calculus by Iteration		2 hours
13	Green-Riemann's Formula. Changes of variables. Applications of Double Integrals		2 hours
14	Triple Integrals. Calculus by Iteration. Changes of variables. Applications		2 hours

Bibliography

1. A. F. Bermant, I. G. Aramanovich, Mathematical Analysis, Ed. Mir, Moscova, 1987
2. G. N. Berman, A Problem Book in Mathematical Analysis, Ed. Mir, Moscova, 1977
3. B. P. Demidovich and col., Problems in Mathematical Analysis, Ed. Mir, Moscova, 1976
4. D. Inoan, Problems in differential and integral calculus, Mediamira, Cluj-Napoca, 2007
5. M. Ivan, Calculus, Ed. Mediamira, Cluj-Napoca, 2002
6. D. Marian, Mathematical Analysis, Ed. Mega, 2012

8.2. Lab classes			
1	Differential Calculus for Real Functions of One Real Variable (Derivatives, Derivatives of Higher Orders. Taylor's Formula. Extrema)	Practical problems Students are asked and encouraged to ask questions	1 hour
	Differential Calculus for Real Functions of Several Variables. Partial derivatives. Partial Derivatives of Higher Orders. Derivatives of Composite Functions		1 hour
2	Directional Derivative. Differential Operators. Differentials. Differentials of higher orders		1 hour
	Taylor's Formula for Real Functions of Several Variables		1 hour
3	Implicit Functions. Changes of Variables		1 hour
	Extrema of Functions of Several Variables.		1 hour
4	Antiderivatives. Riemann integrals. Applications. Improper integrals		2 hours
5	Line Integrals. Applications		2 hours
6	Double Integrals. Applications		2 hours
7	Triple Integrals. Applications		2 hours

Bibliography

3. A. F. Bermant, I. G. Aramanovich, Mathematical Analysis, Ed. Mir, Moscova, 1987
4. G. N. Berman, A Problem Book in Mathematical Analysis, Ed. Mir, Moscova, 1977
5. B. P. Demidovich and col., Problems in Mathematical Analysis, Ed. Mir, Moscova, 1976
6. D. Inoan, Problems in differential and integral calculus, Mediamira, Cluj-Napoca, 2007
7. M. Ivan, Calculus, Ed. Mediamira, Cluj-Napoca, 2002
8. D. Marian, Mathematical Analysis, Ed. Mega, 2012

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

A good engineer must have solid knowledge of mathematics to apply in the domain in which he works because the professional community requires well prepared engineers.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade

Course	The ability to answer to theoretical questions and to solve practical problems	Written test (mark T)	T is 70%
Applications	The activity during classes is appreciated	Questions on each class. Activity of seminar (mark AS) Homework (mark H)	AS is 20% H is 10%
10.4 Minimum performance standard : N=0,7T+0,2AS+0,1H;			
The final credit can be received only if each of the mark's components is fulfilled: N≥5; T≥5			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Dr. Daniela Marian	
	Teachers in charge of application	Dr. Daniela Marian	

Date of approval in the department I.F.

____

Head of department
S.l. dr.ing. Adrian Trif

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of Study	Industrial Engineering
1.5	Study Level	Bachelor of Science
1.6	Programme of study/Qualification	Manufacturing Engineering/engineer
1.7	Full or part time (Type of attendance)	Full time
1.8	Subject code	2.00

2. Data about the subject

2.1	Subject name	Linear algebra, analytical and differential geometry									
2.2	Subject area	Mathematics									
2.3	Course responsible	Prof Dr Peter Radu									
2.4	Seminar/lab classes/project in charge of	Conf Dr Lucia Blaga									
2.5	Year of study	1	2.6	Semester	1	2.7	Assessment	E	2.8	Subject category	DF/DI

3. Estimated total time

3.1	No. of hours per week	2	3.2	of which lecture	2	3.3 Applications	1
3.4	Total no. of hours in the curriculum	42	3.5	of which lecture	28	3.6 Applications	14

Individual study	Hours
Learning from manuals, course notes, bibliography	15
Additional reading and documentation in libraries, electronic platforms and field	7
Preparation of seminars/lab classes, assignments, reports, portfolios, essays	10
Tutorial classes	
Exams and tests	
Other activities	

3.7	Total no. of hours of individual study	33
3.8	Total no. of hours per semester	75
3.9	No. of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	To run the courses/lectures	Blackboard, chalk
5.2	To run the applications	Blackboard, chalk

6. Specific competences

Professional competences	**C1.1.** Identifying the concepts, principles, basic theorems and mathematical methods, physics, chemistry, technical drawing, computer programming. **C1.2**. Using basic knowledge in the fundamental disciplines for theoretical explanation and interpretation of results, theorems, phenomena or specific processes of industrial engineering. **C1.3.** Applying the theorems, principles and basic methods of fundamental disciplines, for basic engineering calculations in design and operation of technical systems specific to industrial engineering, under qualified assistance **C1.4.** Appropriate use of standard assessment criteria and methods of fundamental disciplines for identification, modelling, analysis and qualitative and quantitative assessment of characteristics of the phenomena and parameters as well as the processing and interpretation of the results from specific industrial engineering processes. **C1.5.** Developing of specific industrial engineering projects and models based on identification, selection and use of principles, optimal methods and acknowledged solutions from the fundamental disciplines.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication..

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	- to obtain skills and use the basic results of linear algebra, analytic geometry and linear optimization to illustrate their application in other disciplines
7.2	Specific objectives	to present the basic results of linear algebra and analytic geometry - to illustrate their applications in other disciplines - to know and to be able to operate the basic properties of matricial calculus and that of determinants - required to apply the Gauss-Jordan method - to operate with the notions of linear space, linear dependancy, bases and dimensions - to use the notions of inner product spaces, norm and distance, orthonormal basis - to operate with vectors, planes in spaces, straight lines in space - to be able to calculate angles and distances - to be able to generate surfaces of different types - to use the simplex method for solving linear optimization problems to solutionate the transport problems

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	Matrices and determinats.Laplace Theorem.The inverse of a matrix.	blackboard	
2	Systems of linear equations. The Gauss-Jordan elimination method.		
3	Applications of the Gauss-Jordan elimination method.		
4	Linear spaces and subspaces. Linear dependence		
5	Bases and dimensions		
6	Inner product spaces		
7	Vector in spaces		
	Planes in space		

	Straight lines in space		
	Generation of surfaces		
	Quadric surfaces		
	Plane differential geometry		
	Curves in the Euclidean space		
8.2. Lab classes			
1	Matrices and determinants. Systems of linear equations. The Gauss-Jordan method and applications	blackboard	
2	Linear spaces and subspaces. Linear dependence. Bases and dimensions		
3	Inner product spaces. Vectors in space.		
4	Planes in space. Straight lines in space.		
5	Quadric surfaces.		
6	Plane curves.		
7	Space curves.		

Bibliography

1. Blaga Lucia, Lupsa Liana, Elemente de programare liniara, Ed Risoprint 2002.
2. Blaga Lucia& colectiv, Algebra , Geometrie analitica, Geometrie diferentiala,Ecuatii diefentiale, Culegere de probleme- Ed. UT Press, 1995.
3. Blaga Lucia, Lupşa Liana, Algebra, Analytic Geometry, Differential Geometry, Ed.MEGA, Cluj-Napoca, 2008.
4. Blaga Lucia, Lupşa Liana, Algebra, Analytic geometry, Differential Geometry, Problems, Ed.MEGA, Cluj-Napoca, 2009.
5. Blaga Lucia, Algebra, Optimizare liniară, Geometrie analitică şi diferenţială, Ed.MEGA, Cluj-Napoca, 2012.
6. Blaga Lucia, Theory Application on Algebra, Analytic geometry, Differential geometry, Ed.MEGA, Cluj-Napoca, 2014.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Exam	Written exam	50%
10.5 Applications	Exam	Written exam	50%
10.6 Minimum standard of performance			
5			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Ioan Radu Peter	
	Teachers in charge of application	Luci Blaga	

Date of approval in the department IF ________________________	Head of department S.l. dr.ing. Adrian Trif
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Physics and Chemistry
1.4	Field of study	Mechatronics and robotics
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering /engineer
1.7	Form of education	Full time
1.8	Subject code	3.00

2. Data about the subject

2.1	Subject name			Physics			
2.2	Subject area			Physics			
2.3	Course responsible/lecturer			Prof.dr. Ioan Ardelean – ioan.ardelean@phys.utcluj.ro			
2.4	Teachers in charge of laboratory			Sl.dr.Badea Codruta			
2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	Ex	2.8 Subject category	DF/DI

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	23
Supplementary study in the library, online and in the field	15
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	3
Exams and tests	3
Other activities	

3.7	Total hours of individual study	58
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	General knowledge about high school physics General knowledge of the high school mathematics
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	N/A

6. Specific competences

Professional competences	C1.1. Identifying the concepts, principles, basic theorems and mathematical methods, physics, chemistry, technical drawing, computer programming. C1.2. Using basic knowledge in the fundamental disciplines for theoretical explanation and interpretation of results, theorems, phenomena or specific processes of industrial engineering.
Cross competences	Are abbe document themselves on different topics using the library and the Internet

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To acquire the necessary physics knowledge for understanding the specialized engineering subjects.
7.2	Specific objectives	Acquiring of information and skills to describe the oscillatory motion, elastic waves, sound and ultrasound waves. Understanding the electric and magnetic phenomena The ability to represent the graphical data and their interpretation

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Introduction. The physical quantities of cinematic and dynamics. Measuring units.		
2.	Principles of Newtonian mechanics. Systems of material points. Elements of kinematics and dynamics of the rigid solid.		
3.	Harmonic oscillator, damped oscillator, forced oscillator. Resonance phenomena.		
4.	Overlapping of oscillations.		
5.	Waves. The wave equation of harmonic plane waves. Energy carried by the waves. Intensity, Flux. Doppler’s effect.		
6.	Wave interference. Wave velocity, Group velocity.		
7.	Elements of acoustics and characteristic physical quantities. Sound intensity. Sound pressure. Sound level.		
8.	Sound reflexion and refraction phenomena. Sound attenuation. Reverberation.		
9.	Elements of ultrasound physics. Production and applications of ultrasounds.		
10.	Elements of electrostatics. Electric field intensity. Electric potential. Potential difference. Electric current.		
11.	Gauss law. Local Ohm’s law.		

12.	Magnetic field. Biot-Savart's law. Lorentz's force. Hall effect		
13.	Ampere's law and applications.		
14.	Electromagnetic induction's lawand applications.		

Bibliography
1. H. D. Young, R. A. Freedman - Sears and Zemansky's University Physics with Modern Physics Technology Update (lb. engleza), Pearson – 2013
2. D. Halliday, R. Resnick, J. Walker, Fundamentals of Physics Extended, John Wiley & Sons, 2013
3. I.Ardelean, Fizica pentru ingineri, Ed. UTPres, 2005.
4. http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
5. http://nmr.utcluj.ro/teaching/

8.2. Applications		Teaching methods	Notes
1.	Measuring physical quantities and the evaluation of the errors. Graphical representation.	Experiments performed in small working groups	Active participation of all students. Collaboration between students
2.	Determining the elastic constant of a string		
3.	Study the stationary transverse stationary waves		
4.	Study of the longitudinal stationary waves		
5.	Determining the electric conductivity of metals		
6.	Study of the thermoelectric effect		
7.	Determining the viscosity coefficient of a liquid		

Bibliography
1. H. D. Young, R. A. Freedman - Sears and Zemansky's University Physics with Modern Physics Technology Update (lb. engleza), Pearson – 2013
2. I.Ardelean, Fizica pentru ingineri, Ed. UTPres, 2005.
3. http://nmr.utcluj.ro/teaching/

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The discipline has a fundamental character providing the students with the necessary knowledge and the abilities required to understand the field of building machinery.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	A set of 7 questions about theoretical	Written test (1.5 h)	80%
Applications	Graphical representation of a experimental data set	Written test (0.5 h)	20%
10.4 Minimum standard of performance:			
Correct answer of 4 theoretical questions and the previous performance on 80% of the laboratory works			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof.dr. Ioan Ardelean	
	Teachers in charge of application	Sl.dr.Badea Codruta	

Date of approval in the department IF __________________________	Head of department S.l. dr.ing. Adrian Trif
Date of approval in the faculty CM __________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Physics and chemistry
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	4.00

2. Data about the subject

2.1	Subject name	Chemistry
2.2	Subject area	General chemistry
2.3	Course responsible/lecturer	Prof. JÄNTSCHI Lorentz lorentz.jantschi@gmail.com
2.4	Teachers in charge of laboratories	Prof. JÄNTSCHI Lorentz lorentz.jantschi@gmail.com Dr. Mircea NĂSUI mircea.nasui@chem.utcluj.ro

2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	ex	2.8 Subject category	DF/DI

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	14
Supplementary study in the library, online and in the field	4
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	
Exams and tests	4
Other activities	

3.7	Total hours of individual study	33
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. **Pre-requisites (where appropriate)**

4.1	Curriculum	
4.2	Competence	

5. **Requirements (where appropriate)**

5.1	For the course	Projector: course in electronic format.
5.2	For the applications	The students work in groups (2-5 students), conducted by rotating the laboratory equipment. Requires preparation of working procedures prior to conducting of the experiments.

6. **Specific competences**

Professional competences	Knowledge and understanding of concepts, models, theories and methods of basic chemistry and their appropriate use in professional communication; Using basic knowledge of chemistry for explanation and interpretation of concepts and processes specific situations; Applying the basic principles and methods for solving problems and defined situations typical field of study; Use of criteria and evaluation methods to assess the quality, advantages and limitations of processes, concepts, methods and theories; Filling of activity registry records during and after obtaining the results of laboratory experiments and applying the principles and methods described.
Cross competences	Responsible execution of laboratory activities in conditions of autonomy and support from the supervisor; Familiarizing with specific roles and teamwork activities and distribution of tasks within the team conducted experiments in working groups; Awareness of the need for continuing training; Efficient use of resources (course support, manual laboratory notebook laboratory list of questions and answers; individual documentation) and learning techniques (reading, writing, communication, exercise, problem solving, building issues) for personal d and professional evelopment.

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	Understanding and accomodation with the general concepts of chemistry.
7.2	Specific objectives	Understanding and proper operation with the concepts of chemical compound, chemical structure, chemical process, chemical reaction and chemical equilibrium.

8. **Contents**

8.1. Lecture (syllabus)	Teaching methods	Notes

<table>
<tr><td>1.</td><td>Periodic system; periodic properties; electronic structure</td><td rowspan="14">Using interactive multimedia (students have the opportunity to ask questions)</td><td rowspan="14">Each course takes 2 hours</td></tr>
<tr><td>2.</td><td>The abundance of elements; chemical formulas; stoichiometry</td></tr>
<tr><td>3.</td><td>Minerals; physical and chemical properties; chemical reactions</td></tr>
<tr><td>4.</td><td>Hydrogen; oxygen; water</td></tr>
<tr><td>5.</td><td>Alkali and alkaline earth metals</td></tr>
<tr><td>6.</td><td>"p3-p6" elements block (groups 15-18)</td></tr>
<tr><td>7.</td><td>"d1-d5" elements block (groups 3-7)</td></tr>
<tr><td>8.</td><td>"d6-d10" elements block (groups 8-12)</td></tr>
<tr><td>9.</td><td>"f" elements block (lanthanides and actinides)</td></tr>
<tr><td>10</td><td>Boron group; Carbon group</td></tr>
<tr><td>11</td><td>Organic chemistry; hardness and hard materials</td></tr>
<tr><td>12</td><td>Ceramics; semiconductors; superconducting</td></tr>
<tr><td>13</td><td>Advanced Materials; polymers & plastics; & reaction mechanisms; biomolecules</td></tr>
<tr><td>14</td><td>Methods & models; structure activity / property relationships</td></tr>
<tr><td colspan="4">Bibliography
Lorentz JÄNTSCHI, 2013. General chemistry. Annually updated course support: http://lori.academicdirect.org/courses/
Lorentz JÄNTSCHI, Mihaela Ligia UNGUREŞAN, 2001. Capitole speciale de chimie pentru automatică, UTPres, Cluj-Napoca, Romania. 202 p.
Other sources of information listed at the end of training materials updated annually.</td></tr>
<tr><td colspan="2">8.2. Applications/Seminars</td><td>Teaching methods</td><td>Notes</td></tr>
<tr><td>1.</td><td>Presentation chemistry laboratory. Activities: a. The presentation glassware; b. the presentation of analytical balance; c. are presented and assumed signature protection rules and obligations in chemistry lab</td><td>Exposition and conversation</td><td>2 hours (the first and second week of the semester)</td></tr>
<tr><td>2.</td><td>Coomon operations in the laboratory. Activities: a. Sampling; b. experiments and measurements; c. data analysis; d. Students are divided into groups (2-5 students) work; following (3 ÷ 7) will perform works by rotation cycle (3 → 4, 4 → 5, 5 → 6, 6 → 7; 7 → 3)</td><td>Frontal experiment and conversation</td><td>2 hours (in weeks 3 and 4 of the semester)</td></tr>
<tr><td>3.</td><td>Study of gaseous diffusion and molecular velocities</td><td rowspan="4">Exposition, applicative activity, conversation, work in groups of 2-5 students</td><td rowspan="4">Each lab takes 2 hours</td></tr>
<tr><td>4.</td><td>Qualitative analysis of metals and alloys</td></tr>
<tr><td>5.</td><td>Obtaining of the oxygen and study of the gas laws</td></tr>
<tr><td>6.</td><td>Study the corrosion process by gravimetric and volumetric methods</td></tr>
</table>

7.	Protection against corrosion - nickel plating		

Bibliography
Lorentz JÄNTSCHI, 2016. Experiments and tests of general chemistry. Cluj-Napoca: AcademicDirect. 171 p.
Lorentz JÄNTSCHI, Sorana D. BOLBOACĂ, 2015. General chemistry laboratory activities. Cluj-Napoca: AcademicDirect. 109 p.
Horea Iustin NAŞCU, Liana Teodora MARTA, Elena Maria PICĂ, Violeta POPESCU, Mihaela Ligia UNGUREŞAN, Lorentz JÄNTSCHI, 2002. Chimie – lucrări practice. Cluj-Napoca: UTPres. 159 p.
Elena Maria PICĂ. Laboratory works guide, available in several editions in the UTCN library.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

To corroborate the contents expectations academia and economic focus is on training skills and practical skills to use basic concepts of chemistry to explain the phenomena that manifest in the training of students, namely construction and deployment of chemical experiments that highlight phenomena whose direction and magnitude of interest is ongoing; They are using examples and applications dedicated to the field and collected issues of current concerns of companies employing especially contents and examples of their use are updated annually on the experience gained from exchanges of experience with scientific and professional communities.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Gained knowledge	Testing on the way before the exam	60%
	Final checking	Oral checking with laboratory notebooks	20%
Applications	Chemical formulas	Testing on the way in the 4th and 5th laboratories	10%
	Laboratory activities	Testing on the way in the 6th and 7th laboratories	10%
10.4 Minimum standard of performance			
At each evaluation criterion for promotion is mandatory to take a minimum of half from the total points.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof. Lorentz JÄNTSCHI	
	Teachers in charge of application	Dr. Mircea NĂSUI	

Date of approval in the department IF ________________________	Head of department S.l. dr.ing. Adrian Trif
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	5.00

2. Data about the subject

2.1	Subject name			Computer Programming 1			
2.2	Subject area			DAP, DCA			
2.3	Course responsible/lecturer			Prof. dr. ing. ANTAL Tiberiu Alexandru			
2.4	Teachers in charge of seminars			ANTAL Tiberiu Alexandru			
2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	c	2.8 Subject category	DF/DI

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	18
Supplementary study in the library, online and in the field	16
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	4
Tutoring	0
Exams and tests	6
Other activities	0

3.7	Total hours of individual study	44
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Attendance at the laboratory is mandatory

6. Specific competences

Professional competences	After completing the discipline, students will be able to: • understand the operation principles of PC computers and their hardware; • operate under DOS, Windows and Linux, implement security concepts related to their functioning; • operate with text editors, spreadsheets and vector drawing; • connect computers to the network and the Internet; • create simple web pages; • understand the fundamental differences and similarities between compilers and interpreters; • understand and describe the fundamental numerical algorithms specific application engineering.
Cross competences	Apply the values and ethics of the engineer profession and responsible execution of complex professional tasks in conditions of autonomy and professional independence. Promoting logical reasoning, convergent and divergent, practical applicability, assessment and self-evaluation decisions. Planning their own work priorities, drawing up its own action plan.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Develop communication and interaction between man and machine, understanding security in computer systems and the numerical description of fundamental algorithms.
7.2	Specific objectives	1. Understanding the representation of numbers in the computer and its operation. 2. Operation under DOS, Windows and Linux. The procedure for connecting a computer to the network. 3. Securing computer systems. 4. Build simple Web pages. 5. Operation in Word, Excel and Draw for the achievement of technical documents. 6. Description and creating fundamental numerical algorithms in pseudo, or object-oriented flowchart 7. Development of professional projects and / or research for the design of human-computer interfacing applications or, computer - the computer. 8. Understanding the main idea and scope of microcontrollers in embedded systems.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Brief history of the art of computing.	The use of ICT resources / blended learning, discussions.	Projector and blackboard
2. Hardware architecture of personal computers.		
3. Operating Systems: designs and architectures.		
4. Windows: architecture and implementation.		
5. Linux: architecture and implementation.		
6. Computer Networks.		

7. WWW.		
8. Security concepts in computing.		
9. Data models. Imperative and declarative languages. Common programming paradigms. Compilers and interpreters.		
10. Fundamental algorithms 1: Flowcharts. Pseudo-code Data. Operations with data. Pseudo statements.		
11. Fundamental algorithms 2: Calculation of an expression and function. Maximum (or minimum) of the terms of an array. Sorting.		
12. Fundamental algorithms 3: Inserting an item in an ordered sequence. Calculation of a function using a series expansion. Solving an equation.		
13. Fundamental algorithms 4: Cycles. Matrix operations.		
14. Concepts related to microcontrollers and their applications in the mechanical field.		

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1. Andrew Tanenbaum , Organizarea structurată a calculatoatelor, Agora, 1999, ISBN: 973-97706-4-9.
2. David Solomon, Inside Winows NT, Microsoft Press, 1998, ISBN: 1-57231-677-2.
3. Andrew Tanenbaum, Reţele de calculatoare, Agora, 1998, ISBN: 973-977706-3-0.
4. Ştefan Tanasă, Cristian Olaru, Ştefan Andrei, Java de la 0 la expert, Polirom, 2003, ISBN: 973-681-201-4.
5. Leon Livovschi, Horia Georgescu, Sinteza şi analiza algoritmilor,Ed ştiinţifică şi enciclopedică, 1986
6. Peter Norton, William Stanek, Ghid de programare în Java, Teora, 1997, ISBN: 973-601-719-2.
7. Herber Schild, Java 2 - The Complete Reference, Fourth Edition, Osborne, 2001, ISBN: 0-07-213084-9.
8. Deitel H.M., Deitel P. J., Java - How to programm, Fith Edition, Prentice Hall, 2003, ISBN: 0-13-120236-7.
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10. Knuth, D.E. – Arta programării calculatoarelor. Volumul II – Algoritmi seminumerici, Ed. Teora, 2000.

Knuth, D.E. – Arta programării calculatoarelor. Volumul III – Sortare şi căutare, Ed. Teora, 2002.

11. http://www.east.utcluj.ro/mb/mep/antal/ma/an1sem1/curs%20engleza%20sem%201%20-%202009.zip

8.2. Applications/Seminars	Teaching methods	Notes
1. PC components. Standards for representation of numbers in computers.	The use of ICT resources / blended learning, discussions.	Projector and blackboard
2. Arithmetic operations bases 2, 10 and 16. Conversions. Character coding.		
3. Operating under Windows.		
4. Running Linux (Ubuntu)		
5. Building of a personal Web page.		
6. Word: Document settings. Equations.		
7. Word: Tables. Drawings.		
8. Excel. Tables. Function values. Graphics. Solutions of equations.		
9. Test 1. Creation of a technical text containing equations, tables and figures. Calculation of a given function, its graphic representation and finding solutions of equation in Excel.		
10. Computation of the values of a function. Solving an equation with tangent method.		
11. Calculation of functions using series. Integral calculus.		
12. Calculation of the derivative of a function data. Minimum, maximum for an array.		
13. Determining the average (arithmetic, geometric), with given conditions.		

14. Test 2. Implementation of fundamental algorithms in pseudo code and flowcharts		

Bibliography

1. Andrew Tanenbaum , Organizarea structurată a calculatoatelor, Agora, 1999, ISBN: 973-97706-4-9.
2. David Solomon, Inside Winows NT, Microsoft Press, 1998, ISBN: 1-57231-677-2.
3. Andrew Tanenbaum, Reţele de calculatoare, Agora, 1998, ISBN: 973-977706-3-0.
4. Leon Livovschi, Horia Georgescu, Sinteza şi analiza algoritmilor,Ed ştiinţifică şi enciclopedică, 1986
5. Deitel H.M., Deitel P. J., Java - How to programm, Fith Edition, Prentice Hall, 2003, ISBN: 0-13-120236-7.
6. Knuth, D.E. - Arta programării calculatoarelor. Volumul I – Algoritmi fundamentali, Ed. Teora, 2000
7. Knuth, D.E. – Arta programării calculatoarelor. Volumul II – Algoritmi seminumerici, Ed. Teora, 2000.

Knuth, D.E. – Arta programării calculatoarelor. Volumul III – Sortare şi căutare, Ed. Teora, 2002.

8. http://www.east.utcluj.ro/mb/mep/antal/ma/an1sem1/curs%20engleza%20sem%201%20-%202009.zip
9. http://www.east.utcluj.ro/mb/mep/antal/ma/s1/hard-eng.pdf
10. http://www.east.utcluj.ro/mb/mep/antal/ma/s1/dos-eng.pdf
11. http://www.east.utcluj.ro/mb/mep/antal/ma/s1/win98-eng_ok.pdf
12. http://www.east.utcluj.ro/mb/mep/antal/ma/s1/unix-eng.pdf
13. http://www.east.utcluj.ro/mb/mep/antal/ma/s1/internet-eng.pdf

1. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Students can choose to apply the knowledge gained from the course in industry, research or expand it by attending a master program.

The skills developer in this course will be needed if they will work in companies specialized in special domains (robots, economics, machine building) or in software engineering oriented companies.

2. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Checking the knowledge by answering questions and solving problems presented in the course.	written test evaluation, duration of 2 hours	60%
Applications	Building applications in a required time.	practical evaluation - duration 2 hours	40%
10.4 Minimum standard of performance			
Solving correctly at least 50% of the problems and questions from the laboratory tests and the exam.			

Date of filling in:		Title Surname Name	Signature
10.12.2018	Lecturer	Prof.dr.ing. ANTAL Tiberiu Alexandru	
	Teachers in charge of application	Prof.dr.ing. ANTAL Tiberiu Alexandru	

Date of approval in the department IF ________________________	Head of department S.l. dr.ing. Adrian Trif
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data related to the programme of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of Study	Industrial Engineering
1.5	Study Level	Bachelor of Science
1.6	Programme of study/Qualification	Manufacturing Engineering/engineer
1.7	Full or part time (Type of attendance)	Full time
1.8	Subject code	6.00

2. Data related to the subject

2.1	Subject name	Science and Engineering of Materials I									
2.2	Subject area	Materials science									
2.3	Course responsible	Prof. Eng. Popa Catalin, Ph.D.									
2.4	Seminar/lab classes/project in charge of	Lect. Eng. Prica Virgiliu, Ph.D									
2.5	Year of study	1	2.6	Semester	1	2.7	Assessment	C	2.8	Subject category	DD/DI

3. Total estimated time

3.1	No. of hours per week	3	3.2	of which lecture	2	3.3	Applications	1
3.4	Total no. of hours in the curriculum	42	3.5	of which lecture	28	3.6	Applications	14

Individual study	Hours
Learning from manuals, course notes, bibliography	40
Additional reading and documentation in libraries, electronic platforms and field	
Preparation of seminars/lab classes, assignments, reports, portfolios, essays	14
Tutorial classes	
Exams and tests	4
Other activities	

3.7	Total no. of hours of individual study	58
3.8	Total no. of hours per semester	100
3.9	No. of credit points	4

4. Pre-requisites (where necessary)

4.1	Of curriculum	
4.2	Of competences	Basic knowledge of Physics and Chemistry

5. Requisites (where necessary)

5.1	To run the courses/lectures	
5.2	To run the applications	

6 Specific competences

Professional competences	**C2.4.** Appropriate use of the standard assessment criteria and methods from basic engineering sciences, for identification, modeling, experimentation, analysis and assessment of the qualitative and quantitative aspects, phenomena and definitive parameters as well as gathering data, processing and interpretation of the results from specific industrial engineering trials. **C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology. **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. **C4.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. **C4.5.** Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs **C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication..

7 Subject objectives (according to the specific competences)

7.1	General subject objective	Acquiring the basic understanding of the main categories of engineering materials (alloys, ceramics and glasses, polymers, composites) in what concerns: basic properties of materials; structure of materials at the nano / micro/ macro scale; correlation composition – structure – properties – uses.
7.2	Specific objectives	Theoretical skills: - Structural analysis of the main classes of engineering materials; - Application targeted selection of the material type; - Prescription of the optimal type of heat treatment for a certain application; - Decoding the symbols describing materials in technical documents; - Development of applications employing advanced materials; Practical skills: – Utilize the metallographic microscope; – Manipulate the means for the quantitative analysis of materials; – Employ software products for the materials imaging;

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	Introduction to Materials Science. Classes of engineering materials: metals,	Ppt	Handouts

	polymers, ceramics / glasses, composites. Properties of materials. Crystalline and amorphous structure.	presentations	downloaded from internet
2	Crystallisation of metals. Plastic deformation of metals. Plastic deformation of monocrystals and of the polycrystalline aggregates.		
3	Cold hardening, fracture and recrystallisation. Alloys theory. Phases, structural constituents, binary equilibrium diagrams.		
4	Fe-C alloys. Fe-C diagram. Stable / metastable systems. Crystallisation, phases, structural constituents, properties, structure. Unalloyed steels. Classes, structure, properties, standard symbols.		
5	Cast irons – grey, malleable, ductile. Classes, structure, properties, standard symbols. Basics of heat and thermochemical treatments.		
6	Alloy steels. Classes and properties. Influence of the alloying elements. Structural alloy steels; tools and special properties steels. Nonferrous alloys. Aluminium, copper and their alloys. Classes, structures, properties.		
7	Engineering polymers. Classes, structures, properties, uses. Ceramic materials. Classes, structures, properties, uses. Composite materials with polymer / metal / ceramic matrix; properties, uses.		
8.2. Lab classes			
1	Optical basics and utilization of optical or electron microscopes. Microscopic study of metals.		
2	Macroscopic study of materials.		
3	Structure of alloys in the Fe – cementite system. Steels and white cast irons.		
4	Structure of foundry cast irons.		
5	Structures of heat and thermochemical treatments.		
6	Structure of alloys steels and nonferrous alloys.		
7	Polymers. Ceramics. Composites.		

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1. C. Popa, - Materials lectures, www.utcluj.ro;
2. V. Candea, C. Popa, A. Sechel, M. Buharu – Clasificarea si simbolizarea aliajelor feroase si neferoase, UTPress 2010;
3. V. Candea, C. Popa, T. Marcu – Atlas, structuri metalografice, UTPress 2012;
4. *** - ASM Metals Handbook, vol. 1, 2, ASM International, 1993;
5. H.Colan,G.Arghir,V.Candea,s.a.,Science of materials-Guide of laboratory works Ed.UTCN, Cluj,2002;
6. D.Askeland-Introduction to Materials science,J.Wiley&Sons,1993,

9. Relationship between subject content and expectations of professional community, professional associations and employers in the field of the study programme

According to industrial employers, graduates should have the basic knowledge about the trsucture – properties of the materials they use, about their bulk / surface conditioning and processing capabilities.

10. Assessment

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final mark
Lecture	Understanding of the topics; Ability to solve specific problems; Knowledge of the subjects;	Written test	80%
Applications	Achievement of the practical tasks;	Reports	20%
10.4 Minimum performance standard : 5			
The final credit can be received only if each of the mark’s components is fulfilled: 5			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof. Eng. Popa Catalin, Ph.D.	
	Teachers in charge of application	Lect. Eng. Prica Virgiliu, Ph.D	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	7.0

1. Data about the subject

2.1	Subject name					Descriptive Geometry					
2.2	Subject area					Descriptive Geometry					
2.3	Course responsible/lecturer					Assoc. Prof. PhD. Eng. Andrei KIRALY-					
2.4	Teachers in charge of seminars					As. PhD. Eng. Prodan Vasile Calin- vasile.prodan@auto.utcluj.ro,					
2.5	Year of study	I	2.6	Semester	1	2.7	Assessment	E	2.8	Subject category	DF/DI

2. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					15
Supplementary study in the library, online and in the field					8
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					15
Tutoring					2
Exams and tests					4
Other activities					

3.7	Total hours of individual study	44
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	Math class VII-VIII
4.2	Competence	Spatial view

5. Requirements (where appropriate)

5.1	For the course	
5.2	For the applications	

6. **Specific competences**

Professional competences	Knowledge of the rules and norms of designing various machine parts and assemblies in compliance with current national and international standards Understanding how representation and dimensioning of the assembly of parts in technical drawing Analysis and interpretation of a drawing execution for a play or an assembly drawing of a group of industrial parts used by the beneficiary under optimal conditions
Cross competences	Acquiring theoretical discipline relevant results and developing students' ability to accurately represent machine parts and assemblies from the usual mechanical Applying basic rules on national standards (SR) and international (EN, ISO) in technical design representation and proper dimensioning of a part or assembly

7. **Discipline objectives (as results from the key competences gained)**

7.1	The overall objective of discipline	- transmission and will acquire the rules of representation in plan of objects in space, based on rules and regulations established for the purpose of expressing an idea or conception technical, concerning a machine, device, appliance or installation
7.2	Specific objectives	- acquiring and mastering of a unitary technical language appropriate in view of collaboration between the designer and executor for the practical realization of products

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	General standards of technical drawing: formats, lines, indicator. Geometric constructions	Exposure by computer and Powerpoint application.	2 hours
2.	Descriptive Geometry basics. Projection systems. Double projection planes orthogonal projection. purge point		2 hours
3.	Straight epure. Particular straights.		2 hours
4.	Axonometric representations		2 hours
5.	Straights representation in Descriptive Geometry.		2 hours
6.	Representation of views and sections		2 hours
7.	Dimensioning. Inscription on drawings		2 hours
8.	Dimensioning. Tolerances – linear and geometric		2 hours
9.	Thread representation, Parts with thread representation		2 hours
10.	Representation and quotation flanges		2 hours
11.	Representation and dimensioning of parts made of sheet metal		2 hours
12.	Plane sections. Finding the true sizes of the sections Development of surfaces		2 hours
13.	Parts with flanges representation		2 hours
14.	Shafts - representation, listing registration misconduct Dimensioning.		2 hours

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1. Morling K., Geometric and Engineering Drawing, Routlege, 2012
2. KIRALY Andrei, Descriptive Geometry and Technical Drawing, Course and applications at : www.desen.utcluj.ro
3. KIRALY Andrei - Geometrie Descriptivă și Desen Tehnic, ISBN 978-606-543-458-5, Ed. Mega Cluj, 2016
4. KIRALY Andrei - Bazele Desenului Tehnic, ISBN 978-606-543-279-6, Ed. Mega Cluj
5. Rhodes, R.S., Cook. L.B., Basic engineering Drawing, Pitmanpublishing Limited, London, 1978

8.2. Applications		Teaching methods	Notes
1.	General standards of technical drawing: formats, lines, indicator. Geometric constructions	Exposure by computer and Powerpoint application.	2 hours
2.	Representation of points and lines using orthogonal double projection. Particular lines and planes		2 hours
3.	Layout projections. Piece of wood		2 hours
4.	Determination of the three views when both of them give axonometric representations		2 hours
5.	Axonometric representation		2 hours
6.	The drawing of piece – Dimensioning		2 hours
7.	Colloquium 1 - Representation of parts views + sections + dimensioning.		2 hours
8.	Fasteners Representation		2 hours
9.	Inscription of dimensional tolerances and roughness on the part drawing		2 hours
10.	Geometric deviations and other surface treatments prescription on the part drawing		2 hours
11.	Representation and dimensioning of shafts		2 hours
12.	Representation and dimensioning of parts made of sheet metal		2 hours
13.	Colloquium 2. Complete workshop drawing and dimensioning, Development of surface, Axonometric representation		2 hours
14.	Files handling. Final grades.		2 hours

Bibliography
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7. KIRALY Andrei, Descriptive Geometry and Technical Drawing, Course and applications at : www.desen.utcluj.ro
8. KIRALY Andrei - Geometrie Descriptivă și Desen Tehnic, ISBN 978-606-543-458-5, Ed. Mega Cluj, 2016
9. KIRALY Andrei - Bazele Desenului Tehnic, ISBN 978-606-543-279-6, Ed. Mega Cluj
10. Rhodes, R.S., Cook. L.B., Basic engineering Drawing, Pitmanpublishing Limited, London, 1978

9. **Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field**

10. **Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Theory and applications	N1,N2 – Examination - Written	70 %
Applications	Portfolio	N3_ practical work – 2 hours weekly	30 %

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Assoc Prof. phd.eng. Andrei KIRALY	
	Teachers in charge of application	As. phd eng. Prodan Vasile Călin	

Date of approval in the department IF ________________________	Head of department IF Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	8.10

2. Data about the subject

2.1	Subject name			Modern Language I English			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer			N/A			
2.4	Teachers in charge of seminars			Lect. dr. Cecilia Policsek Cecilia.Policsek@lang.utcluj.ro			
2.5 Year of study	2	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DC/DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	
Supplementary study in the library, online and in the field	
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	22
Tutoring	
Exams and tests	
Other activities	

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general English minimum B1 CEFR

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	A good command of the relevant vocabulary used in professional contexts, a special focus being placed on listening; development of the ability to understand spoken and written technical English; use of English in conversations and talks on technical topics; improvement of the ability to work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence; developing the students' ability to listen to others, as well as their critical thinking

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --prove better ability to listen for detail in relation to conversations and talks on technical topics --prove better ability to speak and write about topics related to their specialization

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
8.2. Applications/Seminars		Teaching methods	Notes
1.	General introduction. Describing technical functions and applications.	Interactive teaching, working in pairs and groups, student projects, debates, focus on problem-solving approaches	
2.	Explaining how technology works. Explaining technical concepts to non-specialists		
3.	Describing specific materials		
4.	Specifying and describing properties		
5.	Discussing quality issues		
6.	Student projects		
7.	Language used to describe component shapes and features		
8.	Explaining and assessing manufacturing techniques		
9.	Working with drawings		
10.	Discussion dimensions and precision		
11.	Discussing design phases and procedures		
12.	Resolving design problems		
13.	Student projects		
14.	Final test		

Bibliography

Eisenbach, I. (2011). *English for Materials Science and Engineering*. Exercises, Grammar, Case Studies. Viewveg + Teubner Verlag.

Hewings, M. (2011). *Advanced Grammar in Use*. Cambridge: Cambridge University Press.
Ibbotson, M. (2010). *Cambridge English for Engineering*. Cambridge: Cambridge University Press.
McCarthy, Michael and Felicity O'Dell (2008). *Academic Vocabulary in Use*. Cambridge: Cambridge University Press
Mya, P., N. Lerner and J. Craig. (2010). *Learning to Communicate in Science and Engineering. Case Studies from MIT.* Cambridge, Mass.: the MIT Press.
"Innovation Is Great"
http://learnenglish.britishcouncil.org/en/britain-great/innovation-great
William, I. (2007). *English for Science and Engineering*. Thomson ELT.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in English in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test + student projects	Final test: 50 % Student projects: 50%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer		
	Teachers in charge of application	Lect. Cecilia Policsek, Ph. D	

Date of approval in the department IF ________________________	Head of department SL.dr.ing.Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Modern Languages and Communication
1.4	Field of study	Machine Building (Instruction in English)
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Machine Building
1.7	Form of education	Full time
1.8	Subject code	DL1209

2. Data about the subject

2.1	Subject name	Modern Language I French					
2.2	Subject area	Foreign Languages					
2.3	Course responsible/lecturer	N/A					
2.4	Teachers in charge of seminars	Assoc.prof.Cristiana Bulgaru,Cristiana.Bulgaru@lang.utcluj.ro					
2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DC/DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					22
Tutoring					
Exams and tests					
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general French minimum A1 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A

5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	Improving the skills of using French in technical context, with a special focus on speaking and presenting; increasing the students' awareness in terms of the rules that govern effective communication in French; developing the students' ability to work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should gain knowledge and develop skills to communicate effectively in a foreign language in professional contexts, a special focus being placed on the students' development of skills related to engaging in a dialog and delivering presentations on technology-related topics
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --speak about topics related to their specialization and deliver presentations --master the grammar-related rules that ensure effective communication in academic and professional contexts

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
8.2. Applications/Seminars		Teaching methods	Notes
1.	General introduction	Interactive teaching, working in pairs and groups, student projects, debates, focus on problem-solving approaches	
2.	Describing movement in a mechanism		
3.	Expressing numbers and quantities		
4.	Strategies of explaining the difference between products		
5.	Short reports and linking words		
6.	Student projects		
7.	Writing a short sequence. Elements of coherence and cohesion		
8.	Using compound nouns in technical contexts		
9.	Use of defining relative clauses in describing devices		

10.	Giving clear instructions 1		
11.	Giving clear instructions 2		
12.	Writing a short description		
13.	Oral examination		
14.	Final test		

Bibliography

1.Ioani, M., *Le français de la communication scientifique et technique,* Ed. Napoca Star, Cluj-Napoca,2002
2.Miquel, C., *Grammaire en dialogues – niveau intermédiaire*, Ed. Clé International, 2007
3.Pãun, C., *Limba franceză pentru ştiinţă şi tehnică*, Ed. Niculescu, Bucureşti, 1999
4. Parizet, M.L., Grandet, E., Corsain, M., *Activités pour le Cadre Européen Commun de Référence – Niveau A1*, Ed. Clé International, 2005
5. Teşculă, C., *Le français de la technique : lexique, grammaire et structures du discours*, Ed. UTPRES, Cluj-Napoca, 2005

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in English in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test + Oral examination	Final test: 60 % Oral examiantion 40%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in: dd.mm.yyyy		Title Surname Name	Signature
	Lecturer		
	Teachers in charge of application	Assoc. Prof. Cristiana Bulgaru, Ph. D	

Date of approval in the department IF ________________________	Head of department SL.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Modern Languages and Communication
1.4	Field of study	Machine Building (Instruction in English)
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Machine Building
1.7	Form of education	Full time
1.8	Subject code	8.30

2. Data about the subject

2.1	Subject name			Modern Languages I German			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer			N/A			
2.4	Teachers in charge of seminars			Lect.dr. M Tripon, Tripon.Mona@lang.utcluj.ro			
2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DC/DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					20
Tutoring					
Exams and tests					2
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	

4.2	Competence	Knowledge of general German A1/A2 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	Improving the skills of using German in general context; increasing the students' awareness in terms of the rules that govern effective communication; developing the students' ability to work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should gain knowledge and develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --master the grammar-related rules that ensure effective communication in academic and professional contexts --understand different types of technical documents --listen for detail in relation to conversations and talks on technical topics --speak and write about topics related to their specialization

8. Contents

8.1.Lecture (syllabus)		Teaching methods	Notes
8.2.Applications/Seminars		Teaching methods	Notes
1.	General introduction	Interactive teaching, working in pairs and groups, student	
2.	Introducing yourself		
3.	Everyday life activities		
4.	University life		

5.	Beeing a technical student	projects, debates, focus on problem-solving approaches	
6.	Engineering branches		
7.	Writing a short sequence		
8.	Writing a short description		
9.	Cv and Letter of Intent		
10.	Types of enterprises		
11.	German entreprises		
12.	Recapitulation		
13.	Final test -written		
14.	Final test- oral		

Bibliography

1. Dengler/Rusch/Schmitz/Sieber: Netzwerk A1-B1. Deutsch als Fremdsprache. Langenscheidt, 2014
2. Dreyer/Schmitt: Lehr-und Übungsbuch der deutschen Grammatik. München: Hueber Verlag 2000.
3. Fearns/R. Buhlmann: Technisches Deutsch für Ausbildung und Beruf. Lehr-und Arbeitsbuch. Verlag Europa-Lehrmittel, 2013.
4. Tripon M.: Faszination Technik. Sprachtrainer Deutsch für Studenten technischer Universitäten. Editura Napoca Star, Cluj-Napoca 2012.
5. Map of materials given by the teacher

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students’ ability to communicate in German in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test written +oral	Final oral test - oral 30 % Final test – written 30% Projects/homeworks: 30% Assiduity 10%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer		
	Teachers in charge of application	Lect. Mona Tripon, Ph. D	

Date of approval in the department IF _________________________	Head of department SL.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	9.00

2. Data about the subject

2.1	Subject name			Sport I			
2.2	Subject area			Sport			
2.3	Course responsible/lecturer			-			
2.4	Teachers in charge of seminars			Șef lucr.dr. Olănescu Mihai, Mihai.Olanescu@mdm.utcluj.ro Șef lucr.dr. Radu Sabău, Radu.Sabau@mdm.utcluj.ro			
2.5 Year of study	I	2.6 Semester	I	2.7 Assessment		2.8 Subject category	DC/DI

3. Estimated total time

3.1 Number of hours per week	1	3.2 of which, course:		3.3 applications:	1
3.4 Total hours in the curriculum	14	3.5 of which, course:		3.6 applications:	14
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					
Tutoring					
Exams and tests					
Other activities					

3.7	Total hours of individual study	36
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	physically fit, necessary skills, knowledge, skills and abilities gained in classes I-XII

5. Requirements (where appropriate)

5.1	For the course	-
5.2	For the applications	Muncii Blvd, no.103-105, Cluj-Napoca,

		Politehnica Swimming Complex Sports Hall, Muncii Blvd, no.103-105, Cluj-Napoca Outdoor and Fitness - Complex Polytechnic

6. Specific competences

Professional competences	- knowledge, skills and movement skills - means and methods for harmonious and balanced physical development - fair play in sport and social activity The capacity and the habit of practicing physical activities for formative, compensatory and recreational purposes: - formative, by maintaining health, harmonious physical development and body resistance, to combat sedentarism; - compensatory, to alleviate the stress created by professional obligations, to restore the body after physical or intellectual effort - Skills for gaining strength and physical strength Organizing and leading a team - the applicability in everyday life and in future professional practice of the knowledge, skills and abilities of body activities; - improving mental attributes: imagination, anticipation, referral, timely and efficient action, responsible independence, altruism.
Cross competences	**CT2 –** Identifying, describing and conducting processes in the projects management field, assuming different roles inside the team and clearly and concisely describing, verbally or in writing, in Romanian and in an international language, the own results from the activity field. Identify the objectives, the available resources, the conditions for their completion. Realization of projects under co-ordination, under conditions of deontological norms, as well as health and safety at work.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	- ensure the maintenance and improving of health by using exercise in combination with natural quenching factors (air, water, sun, etc.) in order to increase the physical and intellectual work potential and to form personality and character; - ensures normal and harmonious physical development; - ensures recreation, restoration, recovery of the body of students; - increases the body capacity for resistance to illness; - assures the acquisition of skills and skills of general and sport-specific movement; - ensures the development of psychomotor skills and moral and willing skills; - ensures the formation of the habit of exercise of physical exercises in leisure time.
7.2	Specific objectives	- extending the core of basic movements, application-utilitarian and elementary motor skills, and developing related motor skills - Independent practice of physical exercise, games and various

		sports - manifestation of team spirit and competition, depending on a system of accepted rules

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Legend: a=basketball b=football c=swimming d=table tennis e=voleyball 1 - Information on the requirements of students. - Testing the level of physical ability of the students. - Accommodating of the students with physical effort. 2 a. Exercises, relays and accommodation games with the ball. b. The appropriation of the technical elements without the ball. c. Accommodation with water. d. Learning how to hold a table tennis racket. e. Fundamental positions, squatting and motion in the field, rotating. 3. a. Basic types of dribbling; rules violations: traveling. b. Learning how to kick the ball with top and side of the foot. c. Getting used with horizontal position in the water. d. Learning the fundamental position. e. Passing the ball overhead with two hands . 4. a. Stops. Pivoting skills. Shooting from standing and from dribbling. b. Learning how to kick the ball with ristul (interior, full, exterior). c. Learning how to breath in the water. d. Learning the specific movements. e. Get the ball thrown (service type). 5. a. Fundamental position. Basic moves or steps without the ball. b. Learning how to kick the ball with the knee and with the hell. c. Learning the floatation on the water. d. Learning the middle-game with the forehand. e. Learning the front service up (distance 4 – 5 m). 6. a. Crossover with and without the ball. b. Learning how to kick the ball with the head. c. Learning the slip in water. d. Simple means learning game with backhand. e. The game without the ball with the simulation of the skills	interactive	

learned. 7. a. Complex technical structures: dribbling, stop, pivot, pass. b. Learning processes driving the ball. c. Learning floatation and slipping on the back. d. Learning middle-game cut with forehand. e. Pick up service with two hands above the head. 8. a. Relationship 1x1. b. Learning the receiving of the ball (damping, relocation, counter-hit) c. Front crawl - learning the legs movement. d. Learning the middle-game cut with the backhand. e. Organization of 3 hits, top pickup. 9. a. Jump shot. b. Learning deceptive movements. c. Learning the legs movement in the same time with breath. d. Learning the middle-game from semi-flight with forehand. e. High lift for attack from zone 3 and 4. 10. a. Games by theme: improving the passing. b. Learning to put the ball back in play. c. Learning the arms movement. d. Learning the middle-game from semi-flight with backhand. e. e. Attack shot in the direction of attack using elk from zone 4. 11. a. Relationship 1x1(overcoming). b. Learning opponent ball dispossession. c. Coordinating the movement of arms and legs. d. Learning the serve with forehand. e. Game 6x6 with simplified rules. 12. a. Complex technical structures: catching, dribbling, stop. b. Learning goalkeepers technical procedures. c. Front crawl on 25-50 m distance. d. Learning the serve with backhand. 13. a. Dribbling with different processes: change of direction, pass. b. Learning free kicks practical maneuvers. c. Start learning and return on one side to front crawl. d. Learning the serve return. e. Lifting for attack from zone 2 and 3 (high, medium, forward). 14. a. Protecting the ball. b. Learning of demarcation, penetration and overcoming. c. Breaststroke - learning the movement of the legs. d. Learning how to return with forehand in line.		

e. Taking the ball from down with two hands.		
Improvement and maintenance of health, athletic ability and fitness		
Improving tehnical exercises learned before using tactic tasks		
Automatization of technical and tactics in game conditions (competition).		
Learning regulations of different sports, to be able to practice and organize leisure-time sport activity.		
Necessary skills to practice independent physical activity		
Improving the drills, combinations, schemes in different sport games		
Close the school situation by passing physical test		
Bibliography 1. Curs de Educaţie fizică – Litografiat UTC-N 2. Dezvoltare fizică generală pentru studenţi – UTC-N 3. Cultură fizică pentru tineret - UTPRES		
8.2. Applications/Seminars	Teaching methods	Notes
Bibliography		

9. **Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field**

The acquired skills will be required for employees who work in environments that require physical activity.

10. **Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	70% + 30% Frequency Active Participation, sports skills and advances	By passing control samples	
10.5 Applications	Medical Exemptions:	The theme for the essay is	

	Minimum 5 attendance to support the essay (assessment). At least 5 attendance to support control samples	chosen from the exposed topics in the first month of the semester. Presentation of the essay. Initial testing at the beginning of the semester (the 4 control samples). Attendance at hours and sustaining of control samples. At the trial tracks progress on initial testing. Control samples: 1. Long jump from standstill 2. Pushups 3. Pullups (M) / Planking (F) 4. Abdomen strength	100% 100%
10.6 Minimum standard of performance			

Date of filling in:		Title Surname Name	Signature
	Lecturer	-	
	Teachers in charge of application	Șef lucr. Olănescu Mihai, Șef lucr.dr. Radu Sabău	

Date of approval in the department IF _________________________	Head of department SL.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data related to the programme of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of Study	Industrial Engineering
1.5	Study Level	Bachelor of Science
1.6	Programme of study/Qualification	Manufacturing Engineering/engineer
1.7	Full or part time (Type of attendance)	Full time
1.8	Subject code	10.00

2. Data related to the subject

2.1	Subject name	Special Mathematics									
2.2	Subject area	Mathematics									
2.3	Course responsible	Blaga Lucia									
2.4	Seminar/lab classes/project in charge of	Blaga Lucia									
2.5	Year of study	1	2.6	Semester	2	2.7	Assessment	E	2.8	Subject category	DF/DI

3. Total estimated time

3.1	No. of hours per week	3	3.2	of which lecture	2	3.3	Applications	1
3.4	Total no. of hours in the curriculum	78	3.5	of which lecture	28	3.6	Applications	14

Individual study	Hours
Learning from manuals, course notes, bibliography	15
Additional reading and documentation in libraries, electronic platforms and field	8
Preparation of seminars/lab classes, assignments, reports, portfolios, essays	10
Tutorial classes	
Exams and tests	
Other activities	

3.7	Total no. of hours of individual study	33
3.8	Total no. of hours per semester	75
3.9	No. of credit points	3

4. Pre-requisites (where necessary)

4.1	Of curriculum	
4.2	Of competences	

5. Requisites (where necessary)

5.1	To run the courses/lectures	Blackboard, chalk

5.2	To run the applications	Blackboard, chalk

6 Specific competences

Professional competences	**C1.1.** Identifying the concepts, principles, basic theorems and mathematical methods, physics, chemistry, technical drawing, computer programming. **C1.2**. Using basic knowledge in the fundamental disciplines for theoretical explanation and interpretation of results, theorems, phenomena or specific processes of industrial engineering. **C1.3.** Applying the theorems, principles and basic methods of fundamental disciplines, for basic engineering calculations in design and operation of technical systems specific to industrial engineering, under qualified assistance **C1.4.** Appropriate use of standard assessment criteria and methods of fundamental disciplines for identification, modelling, analysis and qualitative and quantitative assessment of characteristics of the phenomena and parameters as well as the processing and interpretation of the results from specific industrial engineering processes. **C1.5.** Developing of specific industrial engineering projects and models based on identification, selection and use of principles, optimal methods and acknowledged solutions from the fundamental disciplines.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication..

7 Subject objectives (according to the specific competences)

7.1	General subject objective	- to obtain skills and use the basic results of differential geometry and differential equations to illustrate their aplications in other disciplines
7.2	Specific objectives	After the course the students will be abel to : - recognise the different types of curves and surfaces - recognise the different types of tangency (lines and planes), normals - calculate the lenght of arcs and the angle of arbitrary surfaces - to recognise the different types of differential equations and to find their solutions - to present the basic results of differential geometry - to illustrate their applications in other disciplines

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	Plane curves. Differential properties of the plane curves. The tangent and normal	blackboard	
2	The curvature of plane curves. The envelope of a family of plane curves		
3	Differential properties of curves in space. The moving trihedron		
4	The curvature and torsión of a curve in space		
5	Differential properties of the surfaces		
6	Differential equations -the basic notions. The Cauchy's problem		
7	Integration of differential equations by separating variables; homogenous equation; integrating factor		
	First order linear differential equations. The Bernoulli and Ricatti equations		
	Implicite first order differential equations-the Clairot and Lagrange equations		
	The linear differential equations of n-th order		
	The homogenous n-th order linear differential equations with constant coefficients		
	The solution of nonhomogenous n-th order linear differential equations with constant coefficients		
	The Euler's equation		
	Some notions about systems of differential equations		

8.2. Lab classes			
1	Differential properties of the plane curves	blackboard	
2	Differential properties of curves in space		
3	Differential properties of the surfaces		
4	Differential equations-integration of different types of first order differential equations		
5	Integration of first order linear equations and equations which can be reduced to a linear differential equations		
6	The homogenous differential equation of n-th order with constant coefficients		
7	Nonhomogenous differential equations of n-th order with constant coefficients, Euler's equation.		

Bibliography

1. L. Blaga& colectiv- Algebra , Geometrie analitica, Geometrie diferentiala, Ecuatii diefentiale, Culegere de probleme- Ed. UT Press, 1995
2. L.Blaga, T.Potra, Algebra liniara, programare liniara, geometrie analitică şi diferenţială, Ed. Transilvania Press, 2005
3. Blaga Lucia, Lupşa Liana, Algebra, Analytic Geometry, Differential Geometry, Ed.MEGA, Cluj-Napoca, 2008.
4. Blaga Lucia, Lupşa Liana, Algebra, Analytic Geometry, Differential Geometry. Problems, Ed.MEGA, Cluj-Napoca, 2009.

9. Relationship between subject content and expectations of professional community, professional associations and employers in the field of the study programme

10. Assessment

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final mark
Lecture	-The ability to answer to theoretical questions and theoretical problems.	Written test (T) and oral presentation of the solution of practical problems (mark O)	T is 30% O is 50%
Applications	-The ability to do the parallelism between the theory and formulae in order to solve problems in cooonnection to theory - the ability to do a geometric interpretation of the solutions of a problem from differential geometry or differential equations	Questions os each seminar and individual work (as homework) (mark A)	A is 20%
10.4 Minimum performance standard :			
The final credit can be received only if each of the mark's components is fulfilled:			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer	Conf.dr. Lucia Blaga	
	Teachers in charge of application	Conf.dr. Lucia Blaga	

Date of approval in the department IF _________________________	Head of department Sl.dr.ing. Adrian Trif
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	11.10

2. Data about the subject

2.1	Subject name			Communication			
2.2	Subject area			Communication Techniques			
2.3	Course responsible/lecturer			Conf.dr. Ruxanda Literat Ruxandra.Literat@lang.utcluj.ro			
2.4	Teachers in charge of seminars			dr. Carmen Muresan (CDA)			
2.5 Year of study	1	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DC/DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	50	3.5 of which, course:	14	3.6 applications:	14

Individual study	Hours
Manual, lecture material and notes, bibliography	10
Supplementary study in the library, online and in the field	2
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	7
Tutoring	-
Exams and tests	3
Other activities	-

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	B1 English language skills level

5. Requirements (where appropriate)

5.1	For the course	Attendance of courses - minimum 50%
5.2	For the applications	Compulsory attendance and accomplishment of lab tasks 80%

6. **Specific competences**

Professional competences	- Developing verbal and nonverbal, written and oral strategies and techniques involved in the professional relationships and communication setting; - Analysis and production of some basic document types, introduction into project writing, summarizing; - Interview protocol: relationship of the speaker with the interlocutor; - Improving fluency and accuracy in oral communication.
Cross competences	**CT-1** Applying the values and the ethics of the profession of engineer and the responsible accomplishment of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT-2** Achieving the activities and the teamwork practice at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism, and the continuous personal improvement. **CT-3** Objective self-evaluation of the need of continuous training for labour market insertion and the accommodation to its dynamic requirements for personal and professional development. Effective use of language skills and knowledge of information technology and interpersonal communication.

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	Communication in a professional setting; develop a personal approach on verbal and non-verbal communication.
7.2	Specific objectives	- Be able to find sources, to organise and arrange them and to use them for the specific communication purpose; - Be able to handle basic communication techniques in varied communication contexts; - Use English language skills with more efficiency for personal and professional development

8. **Contents**

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Communication for engineers. Interpersonal and professional communication.	Communicative and interactive teaching strategies; presentation; discussions	Video-projector
2.	Communication in the globalizing world. Global vs. local. General/Specialized language features.		
3.	The communication process. Elements of interpersonal communication. Theories of communication.		
4.	Types of messages. Difficulties in decoding messages.		
5.	Written and oral communication. The scientific discourse. Characteristics and differences.		
6.	Modalities of presenting written technical information. Types of documents.		
7.	Project writing.		

8.	Stages in writing a document: formal letters, reports, projects, articles.		
9.	Ways of presenting information (types and characteristics)		
10.	Dyadic interpersonal communication. Conversational management and problems.		
11.	Interviewing for a job. Structure, conventions and preparation.		
12.	Writing an advertisement.		
13.	Non-verbal communication: functions, types.		
14.	Intercultural communication.		

Bibliography

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Literat, R., *Dimensiuni ale comunicarii*, Ed. Casa Cartii de Stiinta, Cluj-Napoca, 2004.
Literat, R., Course notes support and additional materials.

8.2. Applications/Seminars		Teaching methods	Notes
1.	Types of messages in every-day communication; exercises.	Practice, drills, Integrated skills, Applications; Performances	
2.	Types of messages in science and technology; exercises.		
3.	Presentation of different models of interpersonal communication. Applications.		
4.	Applying discursive techniques to facilitate encoding-decoding of messages.		
5.	Professional meetings: written and oral aspects; management of discussions/conversations.		
6.	Analysing different documents: requirements and constraints.		
7.	Not-taking and summarising – exercises.		
8.	Writing a CV		
9.	Formal letters: application, enquiry, complaint.		
10.	Stages in developing a professional conversation.		
11.	Practising with job interviews. Evaluation criteria.		
12.	Drills and practice with paralanguage and non-verbal cues.		
13.	Commenting on several intercultural situations. Differences and interpretation.		
14.	Oral test.		

Bibliography

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De Vito, J., *The Interpersonal Communication Book*, Pearson Education Inc., 2007.
Literat, R., *Work with words, work with meanings*, U.T.Press, Cluj-Napoca, 2016.
*** Virtual and paper teaching materials

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Improved communication skills will enable the graduate to more flexibly integrate to the labour market and to take part in more complex professional activities.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Understanding and applying communication issues approached in the courses	Written test	50%
Applications	Ability to communicate fluently the message in English Application practice performance	Oral expression Lab tasks	40% 10%
10.4 Minimum standard of performance: attendance of courses 50%, and accomplishment of lab tasks fulfilled at minimum 80%.			
Final mark: written test (T) 0.5 + oral expression (O) 0.4 + lab tasks (L) 0.1			

Date of filling in: dd.mm.yyyy		**Title Surname Name**	**Signature**
	Lecturer	Assoc. Prof. Ruxanda Literat, PhD	
	Teachers in charge of application	Carmen Muresan, PhD	

Date of approval in the department IF ________________________	Head of department SL.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	11.20

2. Data about the subject

2.1	Subject name			General economics			
2.2	Subject area						
2.3	Course responsible/lecturer			Ş.l.dr.ing.,ec. Sava Adriana Mirela – adriana.sava@mis.utcluj.ro			
2.4	Teachers in charge of seminars			Ş.l.dr.ing.,ec. Sava Adriana Mirela – adriana.sava@mis.utcluj.ro			
2.5 Year of study	I	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DC/DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	50	3.5 of which, course:	14	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	12
Supplementary study in the library, online and in the field	
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	8
Tutoring	
Exams and tests	2
Other activities	

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	N/A
4.2	Competence	N/A

5. Requirements (where appropriate)

5.1	For the course	Hall equipped with blackboards and projector
5.2	For the applications	Hall equipped with blackboard and projector

6. Specific competences

Professional competences	
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT2. Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work. CT3. Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Assimilation of economic concepts and notions
7.2	Specific objectives	Assimilating theoretical knowledge regarding the various problems faced by firms and national economies, with the aim of accumulating basic microeconomic and macroeconomic knowledge Acquiring abilities for assessing, interpreting and decision making regarding microeconomic and macroeconomic problems.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Basic notions of economic theory	Interactive lecture with blackboard and projector,	Multimedia
2. Consumer theory		
3. Producer theory		

4. Demand and supply. Market equilibrium	discussions, exemplification	
5. Market and competition		
6. Aggregate demand and aggregate supply. Macroeconomic equilibrium		
7. Unemployment and inflation		

Bibliography

1. Abrudan, I. şi Cândea, D. (coord.) Manual de Inginerie Economică: ingineria şi managementul sistemelor de producţie, Editura Dacia, Cluj-Napoca, 2002. (in TUCN library)
2. Dobrotă, N., Economie politică: o tratare unitară a problemelor vitale ale oamenilor, Editura Economică, Bucureşti, 1997. (in TUCN library)
3. Mankiw, N.G. şi Taylor, M.P. Economics, South-western Cengage Learning, Andover, UK, 2011. (in TUCN library)
4. Samuelson, P.A. şi Nordhaus, W.D. Economie politică, Editura Teora, Bucureşti, 2001. (in TUCN library)
5. Andrei, C.L. Economie, ediţia a doua, Editura Economică, Bucureşti, 2011.
6. Creţoiu, G., Cornescu, V. şi Bucur, I. Economie. Ediţia a III-a, Editura C.H. Beck, Bucureşti, 2011.
7. Bucur, I. Macroeconomie, Editura C.H. Beck, Bucureşti, 2010.
8. Begg, D., Fischer, S. şi Dornbusch, R. Economics fifth edition, McGraw-Hill, Great Britain, 1997.
9. Schnatmann, H. Macroeconomie pentru inginerii economişti – Partea I: Introducere în bazele relaţiilor macroeconomice, Editura U.T. Press, Cluj-Napoca, 2010. (in TUCN library)
10. Schnatmann, H. Macroeconomie pentru inginerii economişti – Partea II: Consideraţii privind modelele macroeconomice de bază în economiile naţionale închise, Editura U.T. Press, Cluj-Napoca, 2010. (in TUCN library)

8.2. Applications/Seminars	Teaching methods	Notes
1. Choice of rational consumer	Lecture, discussions, explanations, case studies, application solving at the blackboard with the students.	Multimedia
2. Producer decision		
3. Production costs		
4. Demand and supply elasticity		
5. Price formation on different market structures		
6. Macroeconomic indicators		
7. Unemployment and inflation		

Bibliography

1. Gogoneaţă, C. şi Gogoneaţă, B. 1100 teste grilă şi probleme de economie cu rezolvări, Editura Universitară, Bucureşti, 2013.
2. Ghişoiu, M. (coord.), Pop Silaghi, M., Jude, C. şi Câlea, S. Micro & macroeconomie: caiet de seminar, Ed. a 3-a, rev., Editura Risoprint, Cluj-Napoca, 2008.
3. Schnatmann, H. Macroeconomie pentru inginerii economişti – Partea a III-a: Exerciţii privind macroeconomia în economiile naţionale închise, Editura U.T. Press, Cluj-Napoca, 2010. (in TUCN library)

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The competences and abilities acquired in the economic field are necessary to future specialists for analyzing and understanding the economic context at microeconomic and macroeconomic levels. These will enable the graduate to adapt to real situations in the economic life.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Knowledge examination by assigning subjects that must be solved in writing (multiple choice test, theoretical subjects, applications)	Written exam – Assessment duration 2 hours	75%
10.5 Applications	Themes are assigned, by choice, for essays preparation. Involvement and attendance at the seminar.	Essay preparation based on the assigned theme. Presentation duration – 15 minutes. Seminar attendance and active participation at debates and applications solving, recorded during the semester.	25%
10.6 Minimum standard of performance			
Knowledge and understanding of the taught theoretical concepts and their application for solving medium complexity applications. Development and presentation of the essay for the seminar at an acceptable level. $E \geq 5$; $S \geq 5$; $N = 0.75E+0.25S$, $N \geq 5$, where N – final grade, E – written exam grade, S – seminar grade.			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Ş.l.dr.ing.,ec. Adriana Mirela SAVA	
	Teachers in charge of application	Ş.l.dr.ing.,ec. Adriana Mirela SAVA	

Date of approval in the department IF ________________________	Head of department IF Ş.l.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Department	Manufacturing Engineering
1.4 Field of study	Industrial Engineering
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Manufacturing Engineering/engineer
1.7 Form of education	Full time
1.8 Subject code	11.30

2. Data about the subject

2.1 Subject name	Ethics and academical integrity						
2.3 Course responsible/lecturer	Conf.dr. Ruxanda Literat						
2.4 Teachers in charge of seminars	Conf.dr. Ruxanda Literat Ruxandra.Literat@lang.utcluj.ro						
2.5 Year of study	I	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DC/DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	50	3.5 of which, course:	14	3.6 applications	14

Individual Study	Hours
Manual, lecture material and notes, bibliography	10
Supplementary study in the library, online and in the field	2
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	7
Tutoring	-
Exams and tests	3
Other activities..................................	-

3.7 Total hours of individual study	22
3.8 Total hours per semester	50
3.9 Number of credit points	2

4. Pre-requisites (where appropriate)

4.1 Curriculum	
4.2 Competence	

5. Requirements (where appropriate)

5.1. For the course	Attendance of courses – minimum 50%
5.2. For the applications	Compulsory attendance and accomplishment of seminar tasks 80%

6. Specific Competences

Professional competences	Knowledge of the fundamental notions in the sphere of academic ethics, their understanding, internalization and application in intellectual activities; Develop ethical competence to build a moral judgement; Knowledge of explicit or implicit rules governing the academic conduct of students' intellectual work in the TUCN; Use of conceptual "tools" to solve ethical and moral dilemmas; Ability to analyze ethical dilemmas and identify possible solutions; Identifying interdisciplinary links.
Cross compentences	CT1 Applying the values and ethics of the engineer profession, knowing the strategies and techniques / tactics of oral and written communication, promoting logical reasoning, convergent and divergent in the responsible accomplishment of professional tasks. CT2 Responsible accomplishment of multidisciplinary work tasks, assuming roles on different hierarchical levels.

7. Discipline objectives (as results from the key competences gained)

7.1 General objective	The course aims to analyze the fundamental theoretical and applicative problems related to academic ethics in order to develop students' ethical competence, the formation of an integrally academic behaviour that will form the basis of a responsible professional career.
7.2 Specific objectives	The theoretical study supported by case studies will allow the: Development of skills for identifying and solving ethical issues; Development and training of engineering research skills; Knowledge and assimilation of explicit or implicit rules governing academic conduct; Respect and application of knowledge gained in academic activity.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	Object and issues of ethics: conceptual delimitations Interdisciplinary approaches	Communicative and interactive teaching strategies; presentation; discussions	Videoprojector
2	Academic responsibilities and rights University code of the student's rights and obligations in the TUCN.		
3	Ethics of scientific research. Principles, problems, solutions		
4	Design, editing and public support of a scientific paper. Originality in research		
5	Plagiarism and auto-plagiarism Types of plagiarism		
6	Lack of academic honesty: consequences and sanctions		

7	Case study: dilemmas and problems		
8.2. Applications/Seminars		Teaching methods	Notes
1	Defining and interpreting the basic concepts of academic ethics. Glossary of terms	Integrated skills, Applications, role-play, debate	
2	Behaviours and attitudes		
3	Standards and regulations of the academic environment regarding good conduct in scientific research		
4	Rules for drafting and supporting the graduation diploma project.		
5	Plagiarizing procedures. Electronic means of identifying plagiarism.		
6	Behaviour and counterproductive attitudes		
7	Topic for discussion: examples of "bad practices" in research		

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Ebony, E.T. and Sassi, K., *An Ethical Dilemma: Talking about Plagiarism and Academic Integrity in the Digital Age*, English Journal 100.6, pp. 47–53, 2011.
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Iordache, V., *Ce înseamnă a plagia*, 2014. Disponibil la http://www.contributors.ro/cultura/ce-inseamna-a-plagia Accesat la data de 27septembrie 2018.
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Sercan, E., *Deontologie academică: ghid practic*, Editura Universităţii din Bucureşti, 2017. Disponibil la: http://www.ftcub.ro/doctorat/Ghid-Practic-Deontologie-Academica.pdf. Accesat la data de 27 septembrie 2018.
*** Carta Universităţii Tehnice (UTCN). Disponibil la https://www.utcluj.ro/media/page_document/245/Carta_UTCN_actualizata_24aprilie2015.pdf Accesat la data de 29 septembrie 2018.
*** Codul universitar al drepturilor și obligațiilor studentului din Universitatea Tehnică din Cluj-Napoca.Disponibil la https://www.utcluj.ro/media/decisions/2013/03/12/Codul_drepturilor_si_obligatilor_studentului_din_UTCN..pdf Accesat la data de 4 septembrie 2018.
*** Legea 206/2004 privind buna conduită în cercetarea științifică, dezvoltarea tehnologică și inovare. Disponibil la https://lege5.ro/Gratuit/gu3donrv/legea-nr-206-2004-privind-buna-conduita-in-cercetarea-stiintifica-dezvoltarea-tehnologica-si-inovare Accesat la data de 5 septembrie 2018.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Improved communication skills will enable the graduate to more flexibly integrate to the labour market and to take part in more complex professional activities.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Final evaluation	Written test	50%
10.5 Applications	Seminar task-based evaluation	Oral test	50%
10.6 Minimum standard of performance: Obtaining grade 5			

Date of filling in:	Teacher in charge of		Signature
	Course	Assoc.Prof. Ruxanda Literat, PhD	
	Seminar	Assoc.Prof. Ruxanda LIterat, PhD	

Date of approval in the Department IF	Head of Department Sl.dr.ing. Adrian TRIF
Date of approval in the Faculty CM ________________________	Dean Prof.dr.eng. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering
1.7	Form of education	Full time
1.8	Subject code	12.00

2. Data about the subject

2.1	Subject name			**Mechanics I**			
2.2	Subject area			Mechanics			
2.3	Course responsible/lecturer			Prof. PhD. Eng. Iuliu NEGREAN - iuliu.negrean@mep.utcluj.ro			
2.4	Teachers in charge of seminars			Lect. PhD. Eng. Adina CRIȘAN- ducaadina@yahoo.com			
2.5 Year of study	1	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 Sem./Lab.:	1/1
3.4 Total hours in the curriculum	100	3.5 of which, course:	28	3.6 Sem./Lab.:	14/14

Individual study	hours
Manual, lecture material and notes, bibliography	21
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	
Exams and tests	3
Other activities	0

3.7	Total hours of individual study	44
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Attendance to laboratories is mandatory.

6. Specific competences

Professional competences	After this course, the students will be capable: 1. To calculate the geometrical parameters of the mass geometry for any body and systems; 2. To establish analyze the conditions of static equilibrium for any body and systems; 3. To establish the parametric equations of motion, distribution of velocities and accelerations for particular motions of the body; 4. To use software applications concerning statics and kinematics of the mechanical systems 5. To analyze the data bases concerning statics and kinematics of the mechanical systems.
Cross competences	Identify the need for continuous training and the effective use of informational and communication as well as training assistance (Internet portals, specialized software, data bases, online courses, etc..) both in Romanian and in an international language

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To master the fundamental principles and general theorems that rules the motion of mechanical systems.
7.2	Specific objectives	• To know the notions regarding: Reduction of the forces; Mass geometry; Equilibrium of the body and mechanical systems; The parametric equations of motion, distribution of velocities and accelerations for particular motions of the body; • To understand phenomena, principles and theorems typical to statics and kinematics of systems; • To assessments the parameters corresponding to motion of the mechanical systems; To synthesize kinematics of mechanical systems.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Notions regarding the reduction of forces	During the teaching process are used classical methods (present the demonstration by writing on the blackboard) for mathematical demonstrations and mechanical diagrams.	The course activities are two hours long and kept one time / week. Students are encouraged to ask questions related to the discussed topics.
2.	The reduction of a certain system of forces. The torsor of reduction. Properties regarding the torsor of reduction.		
3.	Mass geometry.		
4.	The statics of the free rogid body. Geometrical study of position and orientation.		
5.	The statics of the free rogid body. Equilibrium equations.		
6.	The statics of rigid body subjected to links without friction		
7.	The statics of rigid body subjected to links with friction		
8.	The statics of systems.		
9.	The kinematics of a material point. Trajectory, velocity and acceleration of a material point		
10.	The kinematics of a rigid body. General aspects regarding the motion performed by a rigid body.		
11.	The kinematics of a rigid body. Notion of angular velocity and		

	acceleration.		
12.	The particular motions of a rigid body. Translation motion. The rotation around a fixed axis. The helical motion		
13.	The plane – parallel motion		
14.	The rotation around a fixed point (spherical motion)		

Bibliography

1. Bălan, Şt., *Probleme de Mecanică,* Editura Didactică şi Pedagogică, Bucureşti, 1977.
2. Ispas, V., ş.a., *Mecanica,* Editura Dacia, Cluj-Napoca, 1998.
3. Negrean, I., ş.a., *Robotică – Modelarea cinematică şi dinamică,* Editura Didactică şi Pedagogică, Bucureşti, 1997.
4. Negrean, I., *Cinematica şi Dinamica Roboţilor • Modelare • Experiment • Precizie,* Editura Didactică şi Pedagogică, Bucureşti, 1999.
5. Negrean, I., Duca, A., Negrean, C., Kacso, K., *Mecanică avansată în robotică,* Editura UT Press, 2008, ISBN 978-973-662-420-9, 431 p.
6. Negrean, I., Mecanică – Teorie şi aplicaţii, UT Press, 2012, ISBN 978-973-662-523-7, 476p.
7. Ripianu, A., *Mecanica solidului rigid,* Editura Tehnică, Bucureşti, 1973.
8. Ripianu, A., Popescu, P., Bălan, B., *Mecanică tehnică,* Edit. Didactică şi Pedagogică, Bucureşti, 1982.
9. Popescu, P., ş.a., *Culegere de Probleme de Mecanică-Statica,* Centrul de multiplicare al Institutului Politehnic din Cluj-Napoca, 1978.
10. Ripianu, A., ş.a., *Culegere de Probleme de Mecanică-Cinematica,* Centrul de multiplicare al Institutului Politehnic din Cluj-Napoca, 1986.
11. Sarian, M., ş.a., *Probleme de mecanică,* Editura Didactică şi Pedagogică, Bucureşti, 1983.
12. Stoenescu, Al., Ripianu, A., *Culegere de probleme de mecanică,* Editura Didactică şi Pedagogică

8.2. Applications/Seminars		Teaching methods	Notes
1.	General notions regarding the reduction of forces	During seminary classes are used classical methods (present the demonstration of an application by writing on the blackboard), all students being invited to participate actively.	The seminary activity is two hours long and is kept once every two weeks.
2.	Mass geometry		
3.	The statics of a rigid body		
4.	The statics of systems of bodies.		
5.	The kinematics of a material point. The components of velocity and acceleration in Cartesian, cylindrical and intrinsic coordinate (The Frenet's trihedral).		
6.	The kinematics of a rigid body. The particular motions performed by a rigid body. The translation motion. The rotation around a fixed axis. The helical motion.		
7.	The kinematics of a rigid body. The plane – parallel motion. The rotation around a fixed point		

Bibliography

1. Negrean, I., Mecanică – Teorie şi aplicaţii, UT Press, 2012, ISBN 978-973-662-523-7, 476p.
2. Ripianu, A., Popescu, P., Plitea, N., Ursu, N., Balan B, Marcu , V., Ispas, V., Popa, L., Arghir, M., Sagyebo, L., Mugur, G., *Mecanica. Lucrari de laborator. Indrumător*, Cluj-Napoca, Atel. de multiplicare al Instit. Politehnic, Cluj-Napoca, 1984, 174 pg.
3. Bratu, P.P., *Mecanica Teoretică*- Editura IMPULS-Bucuresti-2006.

8.3. Applications/Laboratories		Teaching methods	Notes
1.	Graphical and analytical reduction of a coplanar force system	During laboratory classes experimental methods are used and the obtained results are compared to the theoretical ones. All students are invited to participate actively.	The laboratory activity is two hours long and is kept once every two weeks.
2.	Graphical and analytical determination of the mass center of a planar plate		
3.	Determination of the friction angle using the inclined plane. The study of the equilibrium on the inclined plane		
4.	Determination of sliding and rolling friction coefficients. The study of different types of friction.		
5.	Determination of the mechanical advantage of the levers		
6.	Determination of the reactions for simply supported beams		
7.	Determination of the stress in the bars of a truss		

Bibliography
1. Negrean, I., Mecanică – Teorie şi aplicaţii, UT Press, 2012, ISBN 978-973-662-523-7, 476p. 2. Ripianu, A., Popescu, P., Plitea, N., Ursu, N., Balan B, Marcu , V., Ispas, V., Popa, L., Arghir, M., Sagyebo, L., Mugur, G., *Mecanica. Lucrari de laborator. Indrumător*, Cluj-Napoca, Atel. de multiplicare al Instit. Politehnic, Cluj-Napoca, 1984, 174 pg. 3. Bratu, P.P., *Mecanica Teoretică*- Editura IMPULS-Bucuresti-2006.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

It is acquired through periodic discussions scheduled by the faculty with employers' representatives.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Exam consists in five subjects of theory and applications.	three hours long written examination	80%
Seminaries	Two tests of applications.	It is evaluated by a mark of between 1 and 10	10%
Laboratories	One test and handing over a file with the applications studied during the semester.	It is evaluated by a mark of between 1 and 10	10%
10.4 Minimum standard of performance			
Minimum of five points at exam and a mark of five at seminary and laboratory.			

Date of filling in	Lecturer	Teachers in charge of seminars
01.10.2018	Prof. PhD. Eng. Iuliu NEGREAN	Lect. PhD. Eng. Adina CRIȘAN

Date of approval in the department	Head of department
01.10.2018	Prof. PhD. Eng. Iuliu NEGREAN

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof. PhD. Eng. Iuliu NEGREAN	
	Teachers in charge of application	Lect. PhD. Eng. Adina CRIȘAN	

Date of approval in the department IF _________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof. PhD. Eng. Corina BÎRLEANU

SYLLABUS

1. **Data about the program of study**

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	13.00

1. **Data about the subject**

2.1	Subject name					**Technical Drawing and Infographics**					
2.2	Subject area					Technical Drawing					
2.3	Course responsible/lecturer					Assoc. Prof. PhD. Eng. KIRALY Andrei -andrei.kiraly@auto.utcluj.ro					
2.4	Teacher in charge of seminars					As. PhD. Eng Prodan Vasile Calin – vasile.prodan@auto.utcluj.ro,					
2.5	Year of study	I	2.6	Semester	2	2.7	Assessment	C	2.8	Subject category	DF/DI

2. **Estimated total time**

3.1 Number of hours per week	3	3.2 of which, course:	1	3.3 applications:	2
3.4 Total hours in the curriculum	42	3.5 of which, course:	14	3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					7
Supplementary study in the library, online and in the field					4
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					16
Tutoring					2
Exams and tests					4
Other activities					

3.7	Total hours of individual study	33
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. **Pre-requisites (where appropriate)**

4.1	Curriculum	Descriptive Geometry
4.2	Competence	Spatial view

5. **Requirements (where appropriate)**

5.1	For the course	
5.2	For the applications	

6. **Specific competences**

Professional competences	Knowledge of the rules and norms of designing various machine parts and assemblies in compliance with current national and international standards Understanding how representation and dimensioning of the assembly of parts in technical drawing Analysis and interpretation of a drawing execution for a play or an assembly drawing of a group of industrial parts used by the beneficiary under optimal conditions
Cross competences	Acquiring theoretical discipline relevant results and developing students' ability to accurately represent machine parts and assemblies from the usual mechanical Applying basic rules on national standards (SR) and international (EN, ISO) in technical design representation and proper dimensioning of a part or assembly Synthesis of the basic concepts used in technical drawing to have a correct view, on view in space engineering and sense of proportion in case of mechanical parts and assemblies

7. **Discipline objectives (as results from the key competences gained)**

7.1	The overall objective of discipline	- transmission and will acquire the rules of representation in plan of objects in space, based on rules and regulations established for the purpose of expressing an idea or conception technical, concerning a machine, device, appliance or installation
7.2	Specific objectives	- acquiring and mastering of a unitary technical language appropriate in view of collaboration between the designer and executor for the practical realization of products

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Shafts – representation, dimensioning, prescribing tolerances	Computer and Powerpoint presentations.	2 hours
2.	Representation of threaded assemblies. Representation of assemblies with keys. Riveted assemblies.		2 hours
3.	Representation of welding joints. Representation of elastic assemblies. Gears with gears. Gear and wheel drawing.		2 hours
4.	Chain and belt trainers. Rolling Bearings		2 hours
5.	Bearing slides Drawings of metal constructions.		2 hours
6.	Representation and marking of standardized profiles Assembly drawing. Rules for representation of assembly drawings.		2 hours
7.	Assembly drawing. Quoting, prescribing technical information. Completing the Bill of Materials. Extracting details from the assembly drawing. Shop drawings. Rules and methods of approach.		2 hours

Bibliography

1. Morling K., Geometric and Engineering Drawing, Routlege, 2012
2. KIRALY Andrei, Descriptive Geometry and Technical Drawing, Course and applications at : www.desen.utcluj.ro
3. KIRALY Andrei - Geometrie Descriptivă și Desen Tehnic, ISBN 978-606-543-458-5, Ed. Mega Cluj, 2016
4. KIRALY Andrei - Bazele Desenului Tehnic, ISBN 978-606-543-279-6, Ed. Mega Cluj
5. Rhodes, R.S., Cook. L.B., Basic engineering Drawing, Pitmanpublishing Limited, London, 1978

8.2. Applications		Teaching methods	Notes
1.	Threaded assemblies (screws and bolts) + working shop drawings of the parts	Exposure by computer and Powerpoint application.	2 hours
2.	Riveted assemblies + working shop drawings of the parts		2 hours
3.	Key assemblies (3 types+ shop drawings of parts)		2 hours
4.	Welded assemblies (detailed and simplified representation of a welded assembly		2 hours
5.	LC 1 – Welded, with keys and threaded assemblies		2 hours
6.	Representation and dimensioning of shafts Geometric and dimensional tolerances inscription		2 hours
7.	Representation of gears and geared transmissions, Inscription of roughness and tolerances on the workshop drawings		2 hours
8.	Assembly drawing – Parts sketches		2 hours
9.	Assembly drawing – Representation at scale of the parts		2 hours
10.	Assembly drawing – Assembly drawing - sketch		2 hours
11.	Assembly drawing – Assembly drawing, positioning, Bill of materials, dimensioning tolerances		2 hours
12.	Part extraction drawing		2 hours
13.	LC 2 – Assembly drawing		2 hours
14.	Files handling Final grades.		2 hours

Bibliography
6. Morling K., Geometric and Engineering Drawing, Routlege, 2012
7. KIRALY Andrei, Descriptive Geometry and Technical Drawing, Course and applications at : www.desen.utcluj.ro
8. KIRALY Andrei - Geometrie Descriptivă și Desen Tehnic, ISBN 978-606-543-458-5, Ed. Mega Cluj, 2016
9. KIRALY Andrei - Bazele Desenului Tehnic, ISBN 978-606-543-279-6, Ed. Mega Cluj
10. Rhodes, R.S., Cook. L.B., Basic engineering Drawing, Pitmanpublishing Limited, London, 1978

9. **Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field**

10. **Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Theory and applications	N1,N2 – Examination - Written	70 %
Applications	Portfolio	N3_ practical work – 2 hours weekly	30 %

Date of filling in:		Title Surname Name	Signature
09.12.2018	Lecturer	Conf.dr.ing. KIRALY Andrei	
	Teachers in charge of application	As. PhD. Eng Prodan Vasile Calin	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	14.00

2. Data about the subject

2.1	Subject name			Computer Programming 2			
2.2	Subject area			DAP, DCA			
2.3	Course responsible/lecturer			Prof. dr. ing. ANTAL Tiberiu Alexandru			
2.4	Teachers in charge of seminars			ANTAL Tibeiu Alexandru			
2.5 Year of study	1	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DF/DI

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	4
Supplementary study in the library, online and in the field	5
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	4
Tutoring	0
Exams and tests	6
Other activities	0

3.7	Total hours of individual study	19
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Attendance at the laboratory is mandatory

6. Specific competences

Professional competences	After completing the discipline, students will be able to:
	• identify the type of the Java applications and the conditions in which this can be run;
	• use JDeveloper to create and test a Java code;
	• program in Java:
	  ○ structured and object-oriented;
	  ○ scientific applications that have a graphical user interface.

Cross competences	Apply the values and ethics of the engineer profession and responsible execution of complex professional tasks in conditions of autonomy and professional independence. Promoting logical reasoning, convergent and divergent, practical applicability, assessment and self-evaluation decisions. Planning their own work priorities, drawing up its own action plan.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Development of scientific applications and human-machine communication, implementation object-oriented applications.
7.2	Specific objectives	1. Planning and design program applications in object oriented programming languages to achieve communication applications; knowledge of object oriented programming environments, concepts, instructions operation with files, graphical interfaces achievement; understanding and using concepts, paradigms and models applied in economics and databases artificial 2. Application of advanced integrated software environments for development of interfaces 3. A critical evaluation of quantitative and qualitative methods based on analysis, planning and intelligent selection of solutions to operators interfacing business systems.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. History Java. Benefits. Java and JVM running applications. JDK, Java packages and wraps. Basic concepts. Convention. Compiling and running.	The use of ICT resources / blended learning, discussions.	Projector and blackboard
2. Primitive data types.		
3. Primitive data input/output.		
4. Operators and operands. Priority.		
5. Structured data types. Arrays and strings.		
6. Categories of statements. Sequence and decision.		
7. Iterations 1.		
8. Iteration and jumps.		
9. Classes and Objects: declaration, creation.		
10. Methods and constructors.		
11. Polymorphism and exceptions		
12. Inheritance, overloading and overwriting.		
13. Object oriented principles and design.		
14. GUIs in Swing		

Bibliography

1. Ştefan Tanasă, Cristian Olaru, Ştefan Andrei, Java de la 0 la expert, Polirom, 2003, ISBN: 973-681-201-4.
2. Peter Norton, William Stanek, Ghid de programare în Java, Teora, 1997, ISBN: 973-601-719-2.
3. Herber Schild, Java 2 - The Complete Reference, Fourth Edition, Osborne, 2001, ISBN: 0-07-213084-9.
4. Deitel H.M., Deitel P. J., Java - How to programm, Fith Edition, Prentice Hall, 2003, ISBN: 0-13-120236-7.
5. http://www.east.utcluj.ro/mb/mep/antal/downloads.html

8.2 Seminar / laborator / proiect	Teaching methods	Notes
1. JDeveloper IDE. Steps of creating an application.	The use of ICT resources / blended learning, discussions.	Projector and blackboard
2. Text mode I/O. String type. Conversions from String to in and double.		
3. Simple GUI in Swing using JDeveloper.		
4. Applications with operators: assignment, arithmetic. Conversions and promotions.		
5. Applications with bit, relational and boolean operators.		
6. Applications with if,?:, and switch. Specific Errors		
7. Applications with while, do. Specific Errors.		
8. Applications with for, break şi continue. Specific Errors		
9. Applications with class, new, public, private.		
10. Applications with arrays and strings.		
11. Applying inheritance and polymorphism		
12. Abstraction methods and exceptions in numerical computation.		
13. Data hiding and code reusability.		
14 Swing and 2D graphical primitives.		

Bibliografie

1. Deitel H.M., Deitel P. J., Java - How to programm, Fith Edition, Prentice Hall, 2003, ISBN: 0-13-120236-7.
2. http://www.east.utcluj.ro/mb/mep/antal/downloads.html

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Students can choose to apply the knowledge gained from the course in industry, research or expand it by attending a master program. The skills developer in this course will be needed if they will work in companies specialized in special domains (robots, economics, machine building) or in software engineering oriented companies.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Checking the knowledge by answering questions and solving problems presented in the course.	written test evaluation, duration of 2 hours	60%
Applications	Building applications in a required time.	practical evaluation - duration 2 + 2 hours	40%
10.4 Minimum standard of performance			
A theory problem from the course, an application and a problem that extends an example of the lab.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof.dr.ing. ANTAL Tiberiu Alexandru	
	Teachers in charge of application	Prof.dr.ing. ANTAL Tiberiu Alexandru	

Date of approval in the department IF _________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the programme of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of Study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Programme of study/Qualification	Manufacturing Engineering/engineer
1.7	Full or part time (Type of attendance)	Full time
1.8	Subject code	16.00

2. Data about the subject

2.1	Subject name	Science and engineering of materials II										
2.2	Subject area	Materials science										
2.3	Course responsible	Lect. PAVEL Codruta, Ph.D										
2.4	Teachers in charge of seminars	Lect. PAVEL Codruta, Ph.D										
2.5	Year of study	1	2.6	Semester	2	2.7	Assessment	E	2.8	Subject category	DD/DI	

3. Estimated total time

3.1	No. of hours per week	2	3.2	of which, course	1	3.3	Applications	1
3.4	Total hours in the curriculum	28	3.5	of which, course	14	3.6	Applications	14

Individual study	Hours
Manual, lecture material and notes, bibliography	20
Supplementary study in the library, online and in the field	13
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	8
Tutoring	3
Exams and tests	3
Other activities	-

3.7	Total hours of individual study	47
3.8	Total hours per semester	75
3.9	No. of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competences	To synthesize their knowledge concerning the correlation structure-property in order to broach any problems concerning selection and use of materials.

5. Requirements (where appropriate)

5.1	For the course	N
5.2	For the applications	Presence and test

6. Specific competences

Professional competences	**C2. The combination of knowledge, principles and methods of technical sciences field with graphics for solving specific tasks** **C2.2.** Using the knowledge from the basic engineering sciences to explain and interpret the theoretical and experimental results, the drawings and the specific industrial engineering phenomena and processes. **C4. Develop manufacturing processes** **C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology. **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology.

Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT2.** Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work.

7. Discipline objectives (as results from the key competences gained)

7.1	General subject objective	Synthesise knowledge regarding correlation structure - properties - processing technology to address an engineering view of any problems on material selection.
7.2	Specific objectives	After completion the students will be able: -to identify the most suitable technologies to manufacture the specified parts;

8**. Contents**

8.1. Lecture (syllabus)		Teaching methods	Notes
1	Technology object. The structure of industrial production processes.	Interactive methods using video-projector	2 h
2	Elaboration of ferrous and nonferrous metals. Principles.		2 h
3	Parts manufacturing through casting. Principles, processes, applications.		2 h
4	Parts manufacturing through plastic deformation. Principles, processes, blank.		2 h
5	Parts manufacturing through cutting. Principles, processes, applications.		2 h
6	Parts manufactured from powders. Principles, processes, applications.		2 h
7	Welding. Principles, processes, applications.		2 h

Bibliography

1. AMZA, Gh. - Tehnologia materialelor. EDP, Bucureşti, 1997.
2. NANU, A. - Tehnologie mecanică, Ed. III, EDP, Bucureşti, 1997.
3. CONSTANTINESCU, V., ORBAN, R. - Prelucarea metalelor prin deformare plastică, CCŞ, Cluj-Napoca, 2004.
4. KALPAKJAN, S. - Manufacturing Processes for Engineering Materials, Addison –Wesley Publ.Co, NY, 1993
5. PDF Course support.

8.2. Applications			
1	Testing materials at axial solicitations: tensile, compression.	The tutorial lab – interactive presentation	2 h
2	Testing materials at tangential solicitations: shear, bending, bending shock.		2 h
3	Determination of materials hardness.		2 h
4	Determination of materials defects by non-destructive testing.		2 h
5	Determination of workability by plastic deformation of metallic materials.		2 h
6	Determination of technological properties for metallic and ceramics powders.		2 h
7	Determination of technological properties for welded parts.		2 h

Bibliography

1. BRANDUŞAN, L., PAVEL, C., MUREŞAN, R. - Îndrumător pentru lucrări de laborator la Tehnologia materialelor, UT Pres, 1994.
2. Standarde.
3. PDF Applications support.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Acquired skills will be needed and the employees who operate as engineers.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final mark
10.4 Lecture	Final verification of knowledge	Written paper (2 hours) - N	80 %
10.5 Applications	Tests during the semester	Written test - L	20 %
10.6 Minimum performance standard : M = 0,8*N+0,2*L			
The final credit can be received only if each of the mark's components is fulfilled: M ≥ 5			

Date of filling in:		Title Surname Name	Signature
	Lecturer	S.l.dr.ing. Codruta PAVEL	
	Teachers in charge of application	S.l.dr.ing. Codruta PAVEL	

Date of approval in the department IF

____

Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	17.00

2. Data about the subject

2.1	Subject name			Electrotechnics			
2.2	Subject area			Electrical Engineering			
2.3	Course responsible/lecturer			Prof. Adrian SAMUILA			
2.4	Teachers in charge of seminars			Dr.ing. Mihai BILICI			
2.5 Year of study	I	2.6 Semester	II	2.7 Assessment	V	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	17
Supplementary study in the library, online and in the field	3
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	
Exams and tests	3
Other activities	

3.7	Total hours of individual study	33
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Physics and mathematics courses for engineers
4.2	Competence	Basic knowledge in physics (laws of electromagnetism) and mathematics (vectors and complex numbers)

5. Requirements (where appropriate)

5.1	For the course	Blackboard and multimedia system
5.2	For the applications	Equipment for Electrotechnics and Electrical drives laboratory

6. Specific competences

Professional competences	Describing the theory of basic phenomena in electromagnetism (electromagnetic induction, forces in electric and magnetic field) Analysis of DC electric circuits, single-phase and three-phase AC circuits. Proper use of electrical materials (conductor, semiconductor, dielectric, ferromagnetic). Using basic knowledge in electrical diagrams in order to construct and repair an electrical circuit. Using basic knowledge in construction, operation and safe use of electric equipment. Proper use of DC and AC electric motors. Construction, operation principles, characteristics.
Cross competences	Identification of the objectives to be carried out and the available resources, of the conditions of completion, the work stages, identification of the risks CT2. Identification of the roles and responsibilities in a multidisciplinary team, the application of relationship techniques and efficient work in the team Efficient use of information sources, communication resources and training assisted (Internet portals, software applications, databases, on-line courses, etc.) both in the English and in Romanian language

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To acquire basic knowledge in the field of electrical engineering
7.2	Specific objectives	To understand basic phenomena in electromagnetism and the main applications. To be able to analyze a DC electric circuit, a single-phase and a three-phase AC circuit To understand an electric diagram, to be able to construct and to repair a simple electric circuit To be able to use DC and AC electric motors for variable speed electric drives.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Electric field, electric charge. Voltage, potential difference.	Oral presentation notes on blackboard and multimedia presentation	Students are encouraged to put questions
2.	Applications of the electric fields.		
3.	Electric conduction law. DC electric circuits. Kirchhoff's laws.		
4.	Magnetic field. Forces in magnetic field. Applications.		
5.	Electromagnetic induction law. Applications. Magnetic flux law. Inductivity of an electric circuit		
6.	Ferromagnetic materials, characteristics. Losses in ferromagnetic materials.		
7.	Single-phase AC circuits. Sinusoidal quantities, complex representation.		
8.	Electric impedance, reactance, complex impedance. Active, and reactive power. Power factor.		
9.	Three phase systems. Y and Δ connexions.		
10.	DC motor. Construction, operation principles, characteristics. Applications.		
11.	DC motor: starting, speed control and breaking. Applications.		
12.	Three phase AC motor. Construction, operation principles,		

	characteristics. Applications.		
13.	Three phase AC motor: starting, speed control and breaking. Applications. PM synchronous motors.		
14.	Stepper motor: construction, operation principles, characteristics, control.		

Bibliography

[1] Roman MORAR, Alexandru IUGA, Eugeniu MAN, Vasile NEAMŢU şi Lucian DĂSCĂLESCU. *Electrotechnics and Electrical Machines. Electromagnetism, electric circuits, Measurements.* Cluj-N., Institutul Politehnic, 1991.(in Romanian)

[2] Roman MORAR, Eugeniu MAN, Vasile NEAMŢU, Lucian DĂSCĂLESCU şi Alexandru IUGA. *Electrotechnics and Electrical Machines. Applications.* Cluj-Napoca, Institutul Politehnic, 1987.(in Romanian)

[3] Adrian SAMUILĂ. *Variable speed electric drives.* Cluj-N., Ed. MEDIAMIRA, 1998.(in Romanian)

[4]. Theodor WILDI. *Electrical Machines, Drives, and Power Systems.* New Jersey, Prentice Hall, 1991.

[5] http://ocw.mit.edu/courses/physics/8-02-electricity-and-magnetism-spring-2002/lecture-notes/

8.2. Applications/Seminars		Teaching methods	Notes
1.	Work safety rules in electrical equipment. Electrical symbols. Electric diagrams	Industrial apparatus are used by the students to realize small electric circuits for electric motor drives.	
2.	Start/Stop of a three phase asynchronous motor. (Application 2.1 [1]).		
3.	Start/Stop of a reversible three phase asynchronous motor (Application 2.5 [1]).		
4.	Y-Δ starting of the three phase asynchronous motor. (Application 2.7 [1]).		
5.	Three phase power system. (Application 3.1 [1]).		
6.	Dynamic breaking of the asynchronous motor. (4.1 [1]).		
7.	Assessment of practical skills & knowledge.		

Bibliography

[1] Roman MORAR, Gheorghe Mindru, Alexandru IUGA, *Electrotechnics and Electrical Machines. Applications*. I.P. Cluj, 1978(in Romanian)

[2] R. Morar, L. Dascalescu, A. Iuga, V. Neamtu, E.Man. *Electrotechnics and Electrical Machines*. Measurements, Electric drives. Applications. Cluj-Napoca Polytechnic Institute, 1985.(in Romanian)

[3] Alexandru IUGA, Roman MORAR, Lucian DĂSCĂLESCU. Principle of Electric diagrams. Cluj-Napoca, Polytechnic Institute, 1987.(in Romanian)

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Professional community, professional associations and employers in EU require engineers having thorough technical knowledge in the field of electrical engineering, able to design, construct and use complex and high level of automation equipment.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	The ability to answer to theoretical	Written test without documents	T + A = 50%

	questions and to solve practical problems	for theory (T) and with documents for applications (A)	
Applications	The ability to use electric diagrams	Written test (L)	L = 50%
10.4 Minimum standard of performance			
The final credit can be received only if each of the components is fulfilled: T > 5/10, A > 5/10, L > 5/10.			

Date of filling in
16.02.2018

Lecturer
Prof. Adrian SAMUILA

Teachers in charge of seminars
Prof. Adrian SAMUILA

Date of approval in the department

Head of department
Prof. Calin MUNTEANU

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Prof. Adrian SAMUILA	
	Teachers in charge of application	Dr.ing. Mihai BILICI	

Date of approval in the department IF

____

Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	18.10

2. Data about the subject

2.1	Subject name			English II			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer						
2.4	Teachers in charge of seminars			Lect. Cecilia Policsek, Ph. D. Cecilia.Policsek@lang.utcluj.ro			
2.5 Year of study	1	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DC/ DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					22
Tutoring					
Exams and tests					
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general English minimum B1 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	Improving the skills of using English in technical context, with a special focus on writing; increasing the students' awareness in terms of the rules that govern effective communication in English; developing the students' ability to work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should gain knowledge and develop skills to communicate effectively in a foreign language in professional contexts, a special focus being placed on the students' development of writing-related skills
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --understand different types of technical documents --master the grammar-related rules that ensure effective communication in academic and professional contexts

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
8.2. Applications/Seminars		Teaching methods	Notes
1.	The use of the acronyms. Industrial policy-related language	Interactive teaching, working in pairs and groups, student projects, debates, focus on problem-solving approaches	
2.	The compounds. Different forms of transport		
3.	The modal verbs. Making predictions. The future of transport		
4.	The modal verbs. Safety in the automotive sector		
5.	Student projects		
6.	The adjective. Reading specifications		
7.	Qualifying and comparing. Different types of fuel		
8.	Defining and classifying. Vehicle categories		
9.	The noun phrase. The use of the suffixes and prefixes in the reference to environmentally friendly solutions in the		

	automotive industry		
10.	Past Simple vs. Present Perfect. Writing about the renewables		
11.	Describing components and their function.		
12.	Measurement systems characteristic of the English-speaking world		
13.	Student projects		
14.	Final test		

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Policsek, Cecilia (2015). *English for Engineering Students*. UTPRESS: Cluj-Napoca.

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9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in English in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test + student projects	Final test: 50 % Student projects: 50%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in: dd.mm.yyyy		Title Surname Name	Signature
	Lecturer		
	Teachers in charge of application	Lect. Cecilia Policsek, Ph. D	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	18.20

2. Data about the subject

2.1	Subject name			French II			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer						
2.4	Teachers in charge of seminars			Assoc.prof.Cristiana Bulgaru,Cristiana.Bulgaru@lang.utcluj.ro			
2.5 Year of study	1	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DC/ DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					22
Tutoring					
Exams and tests					
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general French minimum A2 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A

5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	Improving the skills of using French in technical context, with a special focus on writing; increasing the students' awareness in terms of the rules that govern effective communication in French; developing the students' ability to work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should gain knowledge and develop skills to communicate effectively in a foreign language in professional contexts, a special focus being placed on the students' development of writing-related skills
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --understand different types of technical documents --master the grammar-related rules that ensure effective communication in academic and professional contexts

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
8.2. Applications/Seminars		Teaching methods	Notes
1.	The use of the acronyms.	Interactive teaching, working in pairs and groups, student projects, debates, focus on problem-solving approaches	
2.	The compounds. Different forms of transport		
3.	Making predictions. The future of transport		
4.	Safety in the automotive sector		
5.	Reading specifications		
6.	Qualifying and comparing. Different types of fuel		
7.	Defining and classifying. Vehicle categories		
8.	The use of the suffixes and prefixes in the reference to environmentally friendly solutions in the automotive industry		
9.	Writing about the renewables		
10.	Describing components and their function. 1		

11.	Describing components and their function. 2		
12.	Measurement systems		
13.	Oral examination		
14.	Final test		

Bibliography

1.Ioani, M., *Le français de la communication scientifique et technique,* Ed. Napoca Star, Cluj-Napoca,2002
2.Miquel, C., *Grammaire en dialogues – niveau intermédiaire*, Ed. Clé International, 2007
3.Pãun, C., *Limba franceză pentru ştiinţă şi tehnică*, Ed. Niculescu, Bucureşti, 1999
4. Parizet, M.L., Grandet, E., Corsain, M., *Activités pour le Cadre Européen Commun de Référence – Niveau A2*, Ed. Clé International, 2005
5. Teşculă, C., *Le français de la technique : lexique, grammaire et structures du discours*, Ed. UTPRES, Cluj-Napoca, 2005

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in English in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test + Oral examination	Final test: 60 % Oral examination: 40%
10.4 Minimum standard of performance: satisfactory completion of at least 60% of the final test			

Date of filling in: dd.mm.yyyy		**Title Surname Name**	**Signature**
	Lecturer		
	Teachers in charge of application	Assoc.Prof.Cristiana Bulgaru, Ph. D.	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	18.30

2. Data about the subject

2.1	Subject name	Foreign Languages II German					
2.2	Subject area	Foreign Languages					
2.3	Course responsible/lecturer	N/A					
2.4	Teachers in charge of seminars	Lect.dr. M Tripon, Tripon.Mona@lang.utcluj.ro					
2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DC/ DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	
Supplementary study in the library, online and in the field	
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	20
Tutoring	
Exams and tests	2
Other activities	

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	

4.2	Competence	Knowledge of general German A1/A2 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	Improving the skills of using German in general context; increasing the students' awareness in terms of the rules that govern effective communication; developing the students' ability to work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should gain knowledge and develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --master the grammar-related rules that ensure effective communication in academic and professional contexts --understand different types of technical documents --listen for detail in relation to conversations and talks on technical topics --speak and write about topics related to their specialization

8. Contents

8.1.Lecture (syllabus)		Teaching methods	Notes
8.2.Applications/Seminars		Teaching methods	Notes
1.	General introduction	Interactive teaching, working in pairs and groups, student	
2.	Mathematical Operations		
3.	Figures, Forms and Dimensions		
4.	Physics- Types of Forces		

5.	Physics – Action and Reaction	projects, debates, focus on problem-solving approaches	
6.	Industrial Materials – properties		
7.	Industrial Robots: Definition, Classification		
8.	Industrial Robots		
9.	Computer Architecture		
10.	The Modern Workplace		
11.	Internet and Communication		
12.	Revision		
13.	Final test –written		
14.	Final test - oral		

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1. Dengler/Rusch/Schmitz/Sieber: Netzwerk A1-B1. Deutsch als Fremdsprache. Langenscheidt, 2014
2. Dreyer/Schmitt: Lehr-und Übungsbuch der deutschen Grammatik. München: Hueber Verlag 2000.
3. Fearns/R. Buhlmann: Technisches Deutsch für Ausbildung und Beruf. Lehr-und Arbeitsbuch. Verlag Europa-Lehrmittel, 2013.
4. Tripon M.: Faszination Technik. Sprachtrainer Deutsch für Studenten technischer Universitäten. Editura Napoca Star, Cluj-Napoca 2012.
5. Map of materials given by the teacher

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in German in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test written +oral	Final oral test - oral 30 % Final test – written 30% Projects/homeworks: 30% Assiduity 10%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer		
	Teachers in charge of application	Lect. Mona Tripon, Ph. D	

Date of approval in the department IF

____

Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	19.00

2. Data about the subject

2.1	Subject name			Sport II			
2.2	Subject area			Sport			
2.3	Course responsible/lecturer						
2.4	Teachers in charge of seminars			Șef lucr.dr. Radu Sabău, Radu.Sabau@mdm.utcluj.ro			
2.5 Year of study	I	2.6 Semester	I	2.7 Assessment		2.8 Subject category	DC/DI

3. Estimated total time

3.1 Number of hours per week	1	3.2 of which, course:		3.3 applications:	1
3.4 Total hours in the curriculum	14	3.5 of which, course:		3.6 applications:	14
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					
Tutoring					
Exams and tests					
Other activities					

3.7	Total hours of individual study	11
3.8	Total hours per semester	25
3.9	Number of credit points	1

4. Pre-requisites (where appropriate)

4.1	Curriculum	

4.2	Competence	physically fit, necessary skills, knowledge, skills and abilities gained in classes I-XII

5. Requirements (where appropriate)

5.1	For the course	Muncii Blvd, no.103-105, Cluj-Napoca, Politehnica Swimming Complex
5.2	For the applications	Sports Hall, Muncii Blvd, no.103-105, Cluj-Napoca Outdoor and Fitness - Complex Polytechnic

6. Specific competences

Professional competences	
Cross competences	**CT2 –** Identifying, describing and conducting processes in the projects management field, assuming different roles inside the team and clearly and concisely describing, verbally or in writing, in Romanian and in an international language, the own results from the activity field.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	• Harmonious physical development • Maintain health at a high standard
7.2	Specific objectives	• Capacity development effort • Learning and motor skills development • Education volitional qualities

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
	interactive	
Improvement and maintenance of health, athletic ability and fitness		
Improving tehnical exercises learned before using tactic tasks		
Automatization of technical and tactics in game conditions (competition).		
Learning regulations of different sports, to be able to practice and organize leisure-time sport activity.		
Necessary skills to practice independent physical activity		

Improving the drills, combinations, schemes in different sport games		
Close the school situation by passing physical test		
Bibliography 1. Curs de Educaţie fizică – Litografiat UTC-N 2. Dezvoltare fizică generală pentru studenţi – UTC-N 3. Cultură fizică pentru tineret - UTPRES		
8.2. Applications/Seminars	Teaching methods	Notes
Bibliography		

9. **Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field**

Sports activity there in the curriculum of universities and faculties in the country and abroad. Content is consistent with the expectations of professional associates and employers epistemic community representative of the afferent program.

10. **Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	70% + 30% Frequency Active Participation, sports skills and advances	By passing control samples	
10.5 Applications	Medical Exemptions: Minimum 5 attendance	The theme for the essay is chosen from the exposed	100%

	to support the essay (assessment). At least 5 attendance to support control samples	topics in the first month of the semester. Presentation of the essay. Initial testing at the beginning of the semester (the 4 control samples). Attendance at hours and sustaining of control samples. At the trial tracks progress on initial testing. Control samples: 1. Long jump from standstill 2. Pushups 3. Pullups (M) / Planking (F) 4. Abdomen strength	100%
10.6 Minimum standard of performance			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer		
	Teachers in charge of application	Șef lucr.dr. Radu Sabău	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*20.00*

2. Data about the subject

2.1	Subject name			Practical Work I			
2.2	Subject area			*Manufacturing Engineering*			
2.3	Course responsible/lecturer			*Associate Prof.Dr.Eng. Păcurar Răzvan, razvan.pacurar@tcm.utcluj.ro*			
2.4	Teachers in charge of seminars			*Associate Prof.Dr.Eng. Păcurar Răzvan, razvan.pacurar@tcm.utcluj.ro*			
2.5 Year of study	I	2.6 Semester	2	2.7 Assessment	Coll.	2.8 Subject category	O/DD

3. Estimated total time

3.1 Number of hours per week		3.2 of which, course:		3.3 applications:	
3.4 Total hours in the curriculum	75	3.5 of which, course:		3.6 applications:	

Individual study	hours
Manual, lecture material and notes, bibliography	20
Supplementary study in the library, online and in the field	20
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	30
Tutoring	2
Exams and tests	3
Other activities	

3.7	Total hours of individual study	15
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	
5.2	For the applications	

6. **Specific competences**

Professional competences	C6.1. Defining the concepts, theories, methods and basic principles for planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment C6.2. Using the basic knowledge for explanation and interpretation the issues that arise in planning, management and usage of the manufacturing processes and systems on classic machines and/or CNC as well as in quality assurance and product ascertainment. C6.3. Applying of basic principles and methods for planning, management and usage of manufacturing processes and systems, as well as for quality assurance and product ascertainment, under qualified assistance. C6.4. Proper use of standard evaluation criteria and methods to appreciate the quality, the advantages and the limits of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment including dedicated software C6.5. Elaborating professional projects by using the principles and methods established in the field of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product inspection.
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT2. Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work. CT3. Objective self-evaluation of the need of continuous training for labour market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	Getting familiar with the existing technologies, equipment items, tools and devices that are currently used within the industrial companies and organizational structures of the industrial companies (engineering departments, etc.)
7.2	Specific objectives	-To recognize easily the types of semi-products and the technological itinerary alternatives to produce the semi-products and parts made from different types if materials (metallic, plastic, etc.) -To identify easily the technological equipment items, type of tools and devices that are currently used for the technological manufacturing processes

		-To measure easily the dimensional accuracy and surface roughness of the manufactured parts by applying the methods that are currently used in the industry within the quality assurance domain.

8. Contents

8.2. Lab classes	Teaching methods	Notes
1. Organizational structure of the industrial companies	Powerpoint presentation and practical working rooms and laboratories of the Technical University of Cluj-Napoca	Multimedia projector + laptop
2. Equipment items, tools and methods for the elaboration and manufacturing of the semi-products		
3. Equipment items, tools and methods for testing and determining of the mechanical characteristics of the semi-products and parts manufactured by using cutting technologies, forging, casting methods, etc.		
4. Equipment items, tools and methods used in the industry within the quality assurance domain.		
5. Equipment items, tools and methods that are used in the industry for the manufacturing of the products (CNC technologies, forging, casting methods, etc.).		
6. Heat treatment operations that are currently applied in the manufacturing engineering domain.		
7. Technical drawing and tolerances (basic principles)		
Bibliography:		

1. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

2. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.5 Applications	The colloquium consists in verifying the student's knowledge, both by the theoretical and the experimental point of view	The colloquium consists in verifying the student's knowledge (oral testing) and evaluating the content of the practical work notebook	Colloquium (C grade component) , Practical work and notebook (P grade component)
10.6 Minimum standard of performance: C>5; P>5			
The final credit can be received only if each component of the final grade is fulfilled: Grade=0,6C+0,4P			

Date of filling in:		Title Surname Name	Signature
	Teachers in charge of application / Lecturer	Associate Prof. Dr.Eng. Păcurar Răzvan	

Date of approval in the department ____________________________	Head of department Lecturer.dr.eng. Trif Adrian
Date of approval in the faculty ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	101.00

2. Data about the subject

2.1	Subject name			Technical English I			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer			N/A			
2.4	Teachers in charge of seminars			Lect. Cecilia Policsek, Ph. D. Cecilia.Policsek@lang.utcluj.ro			
2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DC/ DFA

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:		3.3 applications:	3
3.4 Total hours in the curriculum	50	3.5 of which, course:		3.6 applications:	42

Individual study	hours
Manual, lecture material and notes, bibliography	
Supplementary study in the library, online and in the field	
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	8
Tutoring	
Exams and tests	
Other activities	

3.7	Total hours of individual study	8
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general English minimum B1 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	Improving the skills of using English in technical context, with a special focus on speaking and presenting; increasing the students' awareness in terms of the rules that govern effective communication in English; developing the students' ability to work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should gain knowledge and develop skills to communicate effectively in a foreign language in professional contexts, a special focus being placed on the students' development of skills related to engaging in a dialog and delivering presentations on technology-related topics
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --speak about topics related to their specialization and deliver presentations --master the grammar-related rules that ensure effective communication in academic and professional contexts

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
8.2. Applications/Seminars		Teaching methods	Notes
1.	General introduction	Interactive teaching, working in pairs and groups, student projects, debates, focus on problem-solving approaches	
2.	Describing movement in a mechanism		
3.	Expressing numbers and quantities		
4.	Strategies of explaining the difference between products		
5.	Short reports and linking words		
6.	Student projects		
7.	Writing a short sequence. Elements of coherence and cohesion		
8.	Using compound nouns in technical contexts		

9.	Use of defining relative clauses in describing devices		
10.	Giving clear instructions		
11.	Writing a short description		
12.	Phrasal verbs and the reference to future trends		
13.	Student projects		
14.	Final test		

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9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in English in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test + student projects	Final test: 50 % Student projects: 50%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in
October 3, 2016

Teachers in charge of seminars

Date of approval in the department
October 5, 2016

Head of department
Assoc. Prof. Ruxanda Literat, Ph. D.

Date of filling in:		Title Surname Name	Signature
	Lecturer		
	Teachers in charge of application	Lect. Cecilia Policsek, Ph. D	

Date of approval in the department IF

____

Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Modern Languages and Communication
1.4	Field of study	Machine Building (Instruction in English)
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Machine Building
1.7	Form of education	Full time
1.8	Subject code	102.00

2. Data about the subject

2.1	Subject name	Technical German I					
2.2	Subject area	Foreign Languages					
2.3	Course responsible/lecturer	N/A					
2.4	Teachers in charge of seminars	Lect.dr. M Tripon Ph.D, Tripon.Mona@lang.utcluj.ro					
2.5 Year of study	1	2.6 Semester	2	2.7Assessment	C	2.8 Subject category	DC/DFA

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					8
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					10
Tutoring					
Exams and tests					4
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general German minimum A2 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	A good command of the relevant vocabulary used in professional contexts; development of the ability to understand spoken and written technical German; use of German in conversations and talks on technical topics; improvement of the ability to work in teams
competence	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --prove better ability to listen for detail in relation to conversations and talks on technical topics --prove better ability to speak and write about topics related to their specialization

8. Contents

8.1.Lecture (syllabus)		Teaching methods	Notes
8.2.Applications/Seminars		Teaching methods	Notes
1.	1. Merkmale der Fachsprache mit Schwerpunkt Maschinenbau	Interactive teaching, working in pairs and groups, student projects, debates, focus on problem-solving	
2.	2. Mathematik		
3.	3. Physikalische Gesetze und Phänomene		
4.	4. Chemie -Allgemeines		
5.	5. Werkstoffe und ihre Eigenschaften		
6.	6.Werkstofftechnik und Umweltschutz		
7.	7. Motoren und Getriebe		
8.	8. Fertigungsverfahren I		
9.	9. Fertigungsverfahren II		

10.	10. Thermische Verfahren	approaches	
11.	11. Arbeitssicherheit		
12.	12. Wiederholung		
13.	13. Mündliche Prüfung		
14.	14. Schriftliche Prüfung		

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9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in German in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2Assessment methods	10.3Weight in the final grade
Course			
Applications		Final test + student projects	Final oral test - oral 30 % Final test – written 30% Projects/homeworks: 30% Assiduity 10%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in: dd.mm.yyyy		**Title Surname Name**	**Signature**
	Lecturer		
	Teachers in charge of application	Lect. Mona Tripon, Ph. D.	

Date of approval in the department IF _________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina Bîrleanu

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	Universitatea Tehnică din Cluj-Napoca
1.2 Facultatea	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Ingineria Fabricaţiei
1.4 Domeniul de studii	Inginerie Industrială
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii/ Calificarea	Tehnologia Construcţiilor de Maşini (în limba engleza)/Inginer
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	201.00

2. Date despre disciplină

2.1 Denumirea disciplinei	**Pedagogie I (Fundamentele pedagogiei. Teoria şi metodologia curriculumului)**						
2.2 Titularul activităţilor de curs	**Conf. univ. dr. Liana Tăuşan** liana.tausan@dppd.utcluj.ro						
2.3 Titularul activităţilor de seminar	**Asociat, Coroian Mihaela**						
2.4 Anul de studiu	**I**	2.5 Semestrul	**2**	2.6. Tipul de evaluare	**E**	2.7 Regimul disciplinei	**DC/ DFA**

3. Timpul total estimat (ore pe semestru al activităţilor didactice)

3.1 Număr de ore pe săptămână	4	din care 3.2 curs	2	din care 3.3 seminar/laborator	2
3.4 Total ore din Planul de învăţământ	56	din care 3.5 curs	28	din care 3.6 seminar/laborator	28

Distribuţia fondului de timp	ore
Studiul după manual, suport de curs, bibliografie şi notiţe	20
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren	20
Pregătire seminarii/laboratoare, teme, referate, portofolii şi eseuri	25
Tutoriat	
Examinări	4
Alte activităţi....	

3.7. Total ore studiu individual	**69**
3.9 Total ore pe semestru	**125**
3.10 Numărul de credite	**5**

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	• Psihologia educației
4.2 de competenţe	• Competențe formate ca urmare a studierii disciplinei Psihologia educației

5. Condiţii (acolo unde este cazul)

5.1 de desfăşurare a cursului	• Participare activă • Sală de curs dotată cu videoproiector, tablă, flip-chart
5.2 de desfăşurare a seminarului/laboratorului	• Lectura bibliografiei recomandate • Documentare suplimentară • Elaborarea şi susţinerea prezentărilor planificate

	• Participare activă

6. Competenţe specifice acumulate

Competenţe profesionale	C1: Proiectarea unor programe de instruire sau educaţionale adaptate pentru diverse niveluri de vârstă/pregătire şi diverse grupuri ţintă; C2: Realizarea activităţilor specifice procesului instructiv-educativ din învăţământul gimnazial; C6:Autoevaluarea şi ameliorarea continuă a practicilor profesionale şi a evoluţiei în carieră; C7:Utilizarea metodelor de cercetare științifică și prelucrare a datelor în domeniul educației; C8:Aplicarea caracteristicilor învăţământului centrat pe elev în proiectarea, implementarea și evaluarea curriculum-ului școlar;
Competenţe transversale	CT1 Aplicarea principiilor si a normelor de deontologie profesionala, fundamentate pe optiuni valorice explicite, specifice specialistului în stiintele educatiei CT2 Cooperarea eficienta în echipe de lucru profesionale, interdisciplinare, specifice desfasurarii proiectelor si programelor din domeniul stiintelor educatiei CT3 Utilizarea metodelor si tehnicilor eficiente de învatare pe tot parcursul vietii, în vederea formarii si dezvoltarii profesionale continue CT4: Promovarea valorilor asociate realizării unui învăţământ de calitate, în conformitate cu politicile educaţionale interne şi în acord cu cele elaborate şi popularizate la nivel european, pe baza cunoașterii specificității domeniului educațional european și a interculturalității

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	• formareacompetenţelor vizând cunoaşterea, interpretarea, prelucrarea şi aplicarea problematicii specifice educației și pedagogiei contemporane şi teoriei şi metodologiei curriculum-ului în cadrul demersurilor didactice de desfăşurare a activităților instructiv-educative;
7.2 Obiectivele specifice	• identificarea corectă a referinţelor empirice ale conceptelor pedagogice şi semnificaţiilor conceptuale ale fenomenelor educaţionale; • cunoaşterea semnificaţiei principalelor concepte din cadrul teoriei curriculum-ului; • dezvoltarea capacităţilor de utilizare a conceptelor pentru analiza critică a proceselor şi produselor curriculare; • analizarea tendințelor de dezvoltare a pedagogiei contemporane, în contextul reformei învăţământului şi educației din țara noastră ; • analizarea tendințelor educației în societatea cunoașterii din secolul XXI; • conturarea unei imagini globale şi relevante asupra problematicii educaţiei şi pedagogiei contemporane; • propunerea unor modalităţi de articulare şi integrare a tipurilor şi formelor existente de educaţie; • analizarea conceptului de educaţie permanentă şi a sistemul instituţional întemeiat pe acest principiu; • definirea şi operaţionalizarea adecvată a obiectivele educaţionale; • aplicarea pe situaţii concrete a criteriilor de selecţie şi organizare a conţinuturilor educaţiei; • operarea cu concepte, structuri şi tipologii curriculare în analiza Curriculum-ului şcolar (naţional) şi identificarea principiilor care au stat la baza acestuia; • propunera unor modalităţi şi cerinţe privind elaborarea curriculum-ului la decizia şcolii;

	• dezvoltarea capacităţilor de analiză, proiectare, implementare şi evaluare a curriculum-ului la nivelul activităţilor didactice; • dezvoltarea motivaţiei pozitive şi a unei atitudini favorabile faţă de profesia didactică, a receptivităţii şi responsabilităţii faţă de schimbările inovatoare din domeniul curriculum-ului; • formarea unei atitudini epistemice deschise şi inovatoare în domeniul educaţional;

8. Conţinuturi

Curs	Metodologie didactică	Nr. ore
Deziderate și perspective ale educației și învățământului în secolul XXI. Politici și practici educaționale în contextul reformei sistemului de învățământ românesc Priorități ale politicilor educaționale din România Direcţii ale reformei sistemului de învățământ din România Deziderate și perspective ale educației de bază în politicile educaționale europene și mondiale Rolul învățământului obligatoriu în ansamblul sistemului național de învățământ	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Pedagogia – ştiinţa educaţiei Constituirea pedagogiei ca ştiinţă Caracterul științific al pedagogiei Sistemul ştiinţelor educaţiei Caracterul interdisciplinar al pedagogiei ca știință Pedagogia tradițională – pedagogia contemporană	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Educaţia – obiect de studiu al pedagogiei Educația – concept, sensuri Funcţiile educaţiei Caracteristicile educaţiei Structura acțiunii educaționale Noi dimensiuni și tendințe ale educației în secolul XXI	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Diversificarea câmpului educației Formele educaţiei: educația formală, educația nonformală, educația informală Educaţia permanentă Autoeducaţia – calitate a omului modern	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Componente şi modalităţi ale educaţiei Componentele educaţiei complexe şi armonioase a personalităţii (intelectuală, morală, estetică, religioasă, tehnologică, fizică); Noi domenii şi modalităţi ale educaţiei (interculturală, incluzivă, ecologică, nutriţională ş.a.); Informatizarea şi educaţia la distanţă.	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Educabilitatea. Factorii dezvoltării psihice	Prelegerea,	2

Conceptul de educabilitate Teorii privind educabilitatea Factorii dezvoltării psihice: ereditatea, mediul, educația Interacţiunea factorilor şi rolul conducător al educaţiei Optimismul pedagogic	Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	
Finalitățile educației Finalitățile educației: ideal, scopuri și obiective educaționale Funcţiile obiectivelor educaţionale Clasificarea obiectivelor educaționale Operaționalizarea obiectivelor educaționale	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	4
Conţinuturile educaţiei şi învăţământului Conţinuturile: concept, structură, tipologie Conţinuturile educaţiei şi conţinuturile învăţământului: interacţiuni şi interferenţe Tradiţional şi modern în abordarea conţinuturilor educaţiei Elaborarea conţinuturilor, surse şi criterii de selecţie şi organizare Abordarea integrată a conținuturilor curriculare – dimensiune a politicilor educaționale contemporane Niveluri ale integrării curriculare: intradisciplinaritatea (monodisciplinaritatea); multidisciplinaritatea / pluridiciplinaritatea; interdisciplinaritatea; transdisciplinaritatea.	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	4
Curriculum-ul – un concept pedagogic integrator Reforma curriculară și Curriculum Național Conceptul de curriculum; perspective şi tendinţe în analiza conceptuală a curriculum-ului Conceptul actual de curriculum: curriculum în sens larg şi curriculum în sens restrâns Structuri şi tipologii curriculare: curriculum nucleu şi curriculum la decizia şcolii, curriculum formal/nonformal/informal, predat/învăţat, curriculum universitar)	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	4
Produsele curriculare Planul de învăţământ Programa şcolară (fişele disciplinelor) Manualele şcolare Alte suporturi curriculare (ghiduri, soft-uri educaţionale, metodici, auxiliare didactice).	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Elemente de metodologie a cercetării pedagogice Conceptele de metodă şi metodologie a cercetării Sistemul metodelor de cercetare pedagogică Tipuri fundamentale de cercetare (fundamentală/aplicativă, constatativă/experimentală, transversală/longitudinală, cantitativă/calitativă) Managementul proiectelor de cercetare pedagogică Relaţia cercetare – dezvoltare în ştiinţele educaţiei.	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2

8.2 Seminar/laborator	**Metode de predare**	**Nr. ore**
Direcţii ale reformei sistemului de învățământ din România Rolul învățământului obligatoriu în ansamblul sistemului național de învățământ	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Pedagogia tradițională – pedagogia contemporană	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Caracteristicile educaţiei Structura acțiunii educaționale	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Formele educaţiei: educația formală, educația nonformală, educația informală Educaţia permanentă Autoeducaţia – calitate a omului modern	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Componentele educaţiei complexe şi armonioase a personalităţii (intelectuală, morală, estetică, religioasă, tehnologică, fizică);	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Factorii dezvoltării psihice: ereditatea, mediul, educația Interacţiunea factorilor şi rolul conducător al educaţiei	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Operaționalizarea obiectivelor educaționale – aplicații, exemple	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	4
Tradiţional şi modern în abordarea conţinuturilor educaţiei Niveluri ale integrării curriculare: intradisciplinaritatea (monodisciplinaritatea); multidisciplinaritatea / pluridiciplinaritatea; interdisciplinaritatea; transdisciplinaritatea.	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Structuri şi tipologii curriculare: curriculum nucleu şi curriculum la decizia şcolii, curriculum formal/nonformal/informal, predat/învăţat, curriculum universitar) Elaborarea unei programe de opțional (CDS)	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	4
Analiza produselor curriculare: planul de învățământ programa şcolară (fişele disciplinelor), manualele şcolare, alte suporturi curriculare (ghiduri, soft-uri educaţionale, metodici, auxiliare didactice).	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Elemente de metodologie a cercetării pedagogice. Elaborarea schiței unui proiect de cercetare pedagogică.	Prezentări, dezbateri, studii de caz,	2

	brainstorming, joc de rol, conversația euristică, explicația	
Evaluare portofoliu seminar	Evaluare prin portofoliu	2

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TĂUŞAN, L.,2012, Dificultăți de adaptare şcolară la preadolescenți, Ed. P.U.C., Cluj-Napoca

TĂUŞAN, L.,2016, Pedagogie. Elemente fundamentale pentru formarea inițială și continuă a cadrelor didactice, Ed. P.U.C., Cluj-Napoca VOICULESCU, F., 2005, Manual de pedagogie contemporană, Ed. Risoprint, Cluj-Napoca

9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

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10. Evaluare

Tip de activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs	Volumul şi corectitudinea cunoştinţelor Rigoarea ştiinţifică a limbajului Organizarea conţinutului Originalitatea Capacitatea de evidențiere a aplicabilității temei teoretice	Probă de evaluare scrisă, durata evaluării: 2 ore	60%
10.5 Seminar/laborator	Elaborarea şi prezentarea materialelor/elementelor componente ale portofoliului Participare activă la seminarii (dezbateri, analiza şi sinteza unor materiale/conținuturi, transpunerea în practică a conţinuturilor teoretice, analize critice) Oroginalitatea și potențialul creativ manifestate de studenți în cadrul activităților de seminar și în întocmirea portofoliului.	Portofoliu	20%
		Observarea curentă a participării active a studenților la seminar	20%
10.6 Standard minim de performanţă			
• 50% rezultat după însumarea punctajelor ponderate conform pct.10.3.			

Data completării:	Titulari	Titlu Prenume NUME	Semnătura
	Curs	Conf. univ. dr. Liana TĂUȘAN	
	Aplicații	Dr Mihaela Coroian	

Data avizãrii în Consiliul Departamentului IF ________________________	Director Departament .... Sl.dr.ing. Adrian TRIF
Data aprobãrii în Consiliul Facultãții CM ________________________	Decan Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	23.00

2. Data about the subject

2.1	Subject name			Tolerance and Dimensional Control			
2.2	Subject area			Quality Control			
2.3	Course responsible/lecturer			Prof. dr. ing. Crişan Liviu - Liviu.Crisan@muri.utcluj.ro			
2.4	Teachers in charge of seminars			S.l. dr. ing. Pop Grigore Marian - Grigore.pop@muri.utcluj.ro			
2.5 Year of study	2	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	24
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	8
Tutoring	0
Exams and tests	2
Other activities	0

3.7	Total hours of individual study	44
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	Basic knowledge of dimensional and geometrical tolerancing
4.2	Competence	Basic knowledge of technical drawings and geometry

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	The practical applications are mandatory

6. Specific competences

Professional competences	C2. Combining the knowledge, principles and methods of the technical field with graphical representations in order to solve specific tasks C2.2 Use of software applications for assisted design of complex products. C.6. Planning, managing and quality assurance of the manufacturing processes
Cross competences	CT1. Promoting logical, convergent and divergent reasoning, practical applicability, assessment and self-evaluation in decision-making.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Developing new skills in metrology, dimensional measurements, geometrical verification, interpretation and representation of geometrical and dimensional tolerances on technical drawings according to the ISO standards.
7.2	Specific objectives	The engineers will learn how to choose the correct measuring device to measure the given geometrical or dimensional tolerance. They will learn how to handle new devices such as 3D measuring and scanning devices.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Introduction**.** The development of dimensional metrology. The place and importance of measurements and control in quality assurance	PowerPoint presentations	Examples and discussions regarding the technical design and its impact on the finished product
2.	Forms, surfaces and dimensions.		
3.	Skin model. History. Tolerance factor. Deviations and fundamental tolerances. Annotation of tolerances.		
4.	ISO system of limits and fits. Fit systems. Choosing the right fit. Tolerance Classes and recommended fits.		
5.	Geometrical Tolerances. Tolerances of form		
6.	Datums**.** Tolerances of orientation.		
7.	Tolerances of location. Tolerances of runout		
8.	Maximum and minimum material requirements		
9.	Roughness, waviness and primary profile		
10.	Measurement errors. Measurement uncertainty.		
11.	Chain of dimensions		
12.	Methods of solving of chain of dimensions		
13.	Coordinate measurements		
14.	Surface Scanning		

Bibliography

1. Liviu Adrian Crișan, Mihai Tripa, Grigore Marian Pop "***Toleranțe și Ajustaje***", editura U.T. PRESS, ISBN 978-606-737-325-7, 2018, http://www.utcluj.ro/editura/;

2. Crisan, L. *Metode moderne de măsurare. Specificaţii geometrice ale produselor* – Editura DACIA, Cluj Napoca, 2004, ISBN 973-35-1840-9
3. Itu,T.,Tripa, M. – Tolerante si ajustaje – Editura U.T.PRESS, Cluj Napoca, 2008, ISBN 978-973-662-426-1
4. F. Charpentier, Handbook for the geometrical specification of products. The ISO-GPS standards, Edit. Réseau Canopé, ISBN : 978-2-240-03973-6, 2016
5. L. Mathieu, A. Ballu, "GPS card": A Tool for Univocal Expression of Geometrical Specifications, Proceedings of the 10th CIRP Seminar on Computer Aided Tolerancing, 2007, 1-10
6. Henzold, G.: Geometrical Dimensioning and Tolerancing for Design, Manufacturing and Inspection, A handbook for Geometrial Product Specification using ISO and ASME standards, second edition, 2010, ISBN 978-0-7506-6738-8.
7. Prof. Dr.-Ing. Bernd Klein, Toleranzmanagement Dimensionelle und Geometrische Produktspezifizierung durch, Universität Kassel
8. MUVOT- Blended Learning course on Measurement Uncertainty for advanced vocational training, Project Coordinator, Wojciech Plowucha, www.muvot.ath.eu.
9. Humienny, Z., s.a. - Geometrical Product Specifications. Course for Technical Universities, 2001

ISO GPS STANDARDS ***

EN ISO 1101:2013: Geometrical product specifications (GPS) - Geometrical tolerancing - Tolerances of form, orientation, location and run-out (ISO 1101:2012, including Cor 1:2013)

EN ISO 5459:2012: Geometrical product specifications (GPS) - Geometrical tolerancing - Datums and datum systems (ISO 5459:2011)

ISO 5458:1998 Geometrical Product Specifications (GPS). Geometrical tolerancing. Positional tolerancing.

SR EN 22768-1:1995: General tolerances. Part 1: Tolerances for linear and angular dimensions without individual tolerance indications;

SR EN 22768-2:1995: General tolerances. Part 2: Geometrical tolerances for features without individual tolerance indications;

SR EN ISO 8015:2011: Geometrical product specifications (GPS) - Fundamentals - Concepts, principles and rules (ISO 8015:2011);

SR EN ISO 1302:2002 ver.eng. Specificaţii geometrice pentru produse (GPS). Indicarea stării suprafeţei în documentaţia tehnică de produs

ISO 14405-1:2016 GPS – Dimensional tolerancing – Part 1: Linear sizes ISO 14405-2:2011 GPS – Dimensional tolerancing – Part 2: Dimensions other than linear sizes

ISO 14405-3:2016 GPS – Dimensional tolerancing – Part 3: Angular sizes

ISO 14406:2010 GPS – Extraction

ISO 14638:2015 GPS – Matrix model

8.2. Applications/Seminars		Teaching methods	Notes
1.	Introduction	PowerPoint presentations	Choosing the right device for correct measurement
2.	Gauge Blocks		
3.	Dimensional measurements using calipers		
4.	Dimensional measurements using micrometers		
5.	Dimensional measurements using dial gauges		
6.	Measurements of linear dimensions using digital instruments (calipers, dial gauges and micrometers) connected to a computer		
7.	Measurements of angles and cones		
8.	Surface roughness measurement		
9.	Calculation of ISO fits		
10.	Chains of dimensions. Problem solving		
11.	Coordinate measurements I		
12.	Coordinate measurements II		
13.	3D Scanning. The use of 3D Scanning Machine.		
14.	Final Test		
Bibliography			

1. Liviu Crisan, Mihai Tripa, Pop Grigore, Control Dimensional, îndrumător pentru lucrări de laborator", editura U.T. PRESS, ISBN 978-606-737-027-0, 2014
2. Itu, T. ; Crişan, L.; Breazu, E. ; Pavel, C. -Toleranţe si măsurări tehnice. Lucrări de laborator. Lito IPCN 1990.
3. Itu, T. ; Crişan, L.; Ogrean, O. ; Pay, G. - Tolerante si control dimensional. Lucrări de laborator. Culegere de probleme. Lito Univ. Baia Mare 1993.
4. Itu,T.,Tripa, M. – Tolerante si ajustaje – Editura U.T.PRESS, Cluj Napoca, 2008, ISBN 978-973-662-426-1
5. Itu, T; Crisan, L.,s.a - *Toleranţe si măsurări tehnice*. Lucrări de laborator. Lito IPCN 1990.

ISO GPS STANDARDS ***

SR EN ISO 3274:2001 ver.eng. Specificaţii geometrice pentru produse (GPS). Starea suprafeţei. Metoda profilului. Caracteristici nominale ale aparatelor de măsură cu contact (palpator)

ISO 3611:2010 GPS – Dimensional measuring equipment: Micrometers for external measurements – Design and metrological characteristics

ISO 3650:1998 GPS – Length standards – Gauge blocks ISO 3650:1998/Cor 1:2008

ISO 4287:1997 GPS – Surface texture: Profile method – Terms, definitions and surface texture parameters ISO 4287:1997/Amd 1:2009 Peak count number ISO 4287:1997/Cor 1:1998 ISO 4287:1997/Cor 2:2005

ISO 4288:1996 GPS – Surface texture: Profile method – Rules and procedures for the assessment of surface texture ISO 4288:1996/Cor 1:1998

ISO 10360-4:2000 GPS – Acceptance and reverification tests for coordinate measuring machines (CMM) – Part 4: CMMs used in scanning measuring mode ISO 10360-4:2000/Cor 1:2002

ISO 10360-5:2010 GPS – Acceptance and reverification tests for coordinate measuring machines (CMM) – Part 5: CMMs using single and multiple stylus contacting probing systems

ISO 10360-6:2001 GPS – Acceptance and reverification tests for coordinate measuring machines (CMM) – Part 6: Estimation of errors in computing Gaussian associated features ISO 10360-6:2001/Cor 1:2007

ISO 10360-7:2011 GPS – Acceptance and reverification tests for coordinate measuring machines (CMM) – Part 7: CMMs equipped with imaging probing systems

ISO 10360-8:2013 GPS – Acceptance and reverification tests for coordinate measuring systems (CMS) – Part 8: CMMs with optical distance sensors

ISO 10360-9:2013 GPS – Acceptance and reverification tests for coordinate measuring systems (CMS) – Part 9: CMMs with multiple probing systems

ISO 10360-10:2016 GPS – Acceptance and reverification tests for coordinate measuring systems (CMS) – Part 10: Laser trackers for measuring point-to-point distances

ISO 10360-12:2016 GPS – Acceptance and reverification tests for coordinate measuring systems (CMS) – Part 12: Articulated arm coordinate measurement machines (CMM)

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The competences gained will be necessary for the engineers that work in companies having an activity domain in industrial engineering, mechanical engineering and design.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Theoretical problem solving	Written test	60%
Applications	Final Test	Practical test	40%
10.4 Minimum standard of performance: To solve the problems according to a grade of 5			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof. dr. ing. Crișan Liviu	
	Teachers in charge of application	S.l. dr. ing. Pop Grigore Marian	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing.
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	24.00

2. Data about the subject

2.1	Subject name	Mechanisms I					
2.2	Subject area	Mechanisms					
2.3	Course responsible/lecturer	Şef Lucr.dr.ing. Teutan Emil – emil.teutan@mdm.utcluj.ro					
2.4	Teachers in charge of seminars	As. dr.ing. Ianosi Alexandru – alexandru.ianosi@mdm.utcluj.ro					
2.5 Year of study	2	2.6 Semester	1	2.7 Assessment	E	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	52	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	12
Supplementary study in the library, online and in the field	9
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	6
Tutoring	0
Exams and tests	3
Other activities	0

3.7	Total hours of individual study	33
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Mechanics
4.2	Competence	Knowledge of mechanics, physics, mathematics. Practical skills.

5. Requirements (where appropriate)

5.1	For the course	Class amphitheater, equipped with video projector and screen
5.2	For the applications	Work on groups of students (2-3 students), performed on laboratory equipment. Individual work themes. Multimedia

		presentations.

6. Specific competences

Professional competences	**C2.1.** Defining the principles and the methods of basic science industrial engineering field associated with graphics – technical drawing. **C2.2.** Using the knowledge from the basic engineering sciences to explain and interpret the theoretical and experimental results, the drawings and the specific industrial engineering phenomena and processes **C2.3.** Applying the principles and methods from basic science of industrial engineering domain and associated with graphics - technical drawing, for strength calculations, sizing, establishing the technical conditions, establishing correspondence between features and functional role prescribed, and so on, in specific applications of industrial engineering under qualified help. **C2.4.** Appropriate use of the standard assessment criteria and methods from basic engineering sciences, for identification, modeling, experimentation, analysis and assessment of the qualitative and quantitative aspects, phenomena and definitive parameters as well as gathering data, processing and interpretation of the results from specific industrial engineering trials. **C2.5.** Elaboration of professional projects specific to industrial engineering on the basis of combining and usage of knowledge, principles and methods from the field of basic sciences of industrial engineering domain and their association with graphics –technical graphics
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT2.** Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	
7.2	Specific objectives	• Studies on structure optimized mobile mechanical systems adaptable machine tools and industrial manufacturing systems; • Studies on the bar kinematic mechanisms with varying degrees of mobility; • Studies on the kinematics of mechanisms with gears, gear systems and planetary ordinary.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Lecture 1. Structural analysis of the mechanisms	- Presentation classical themes, - Presentation using the projector, blackboard exposure - Experiment exemplary - Interactive course involving students on topics pre announced	The issue of each work is carried out within 2 hours
Lecture 2. The mobility of the mechanisms		
Lecture 3. Elements / passive joints and equivalent arrangements		
*Lecture 4.*Structure group. Methods and techniques for structuring mechanisms on the basis of structural groups.		
Lecture 5. Analysis of plane kinematic mechanisms by graphic-analytical methods		
of the mechanisms *6.* Analysis of plane kinematic mechanisms by means of transmission functions		
Lecture 7. Synthesis bar mechanisms.		
*Lecture 8.*Mechanisms gear. Basic Law of engagement. Generation, and properties of the equations of the involute.		
*Lecture 9.*Gear units with parallel axes. Cylindrical spur gears with inclined teeth.		
Lecture 10. Compating axle gears. Conical gears		
Lecture 11. Cross-axle gears. Worm gears		
Lecture 12. Kinematic analysis of ordinary gears. Gear train		
Lecture 13. The kinematic analysis of differential and planetary gears		

Lecture 14. Applications of mechanisms with gears		

Bibliography

[1] Handra-Luca, V., Mechanisms, Lito. IPC-N, Cluj-Napoca, 1980. Share 313 132 (181 pieces)
[2] Handra-Luke, V., Transmission functions in the study of mechanisms, Ed.Academiei, Bucharest, 1983; Share 367 471 (213 pieces)
[3] Handra-Luca, V., Stoica, IA, Introduction to the theory of mechanisms, Ed.Dacia, Cluj, Vol. I-1982, Number 355 341/1 (281 units); Vol. II, 1983, Number 355 341/2 (190 units).
[4] Ardelean, I., Handra-Luke, V., Synthesis mechanisms of technological equipment, Ed.MEDIAMIRA, Cluj Napoca 2000 share 497 125 (88 pieces)
[5] Teutan. E. Modeling and simulation mechanisms with special topology, Ed. Risoprint, 2018

8.2. Applications/Seminars	Teaching methods	Notes
Applications *1.*The study elements and kinematic couplings. Determination class of couplers	Applications exemplary; - Comments by breakdowns of the results of experiments; - Modeling, simulation demonstration; - Using specialized software applications; - Documentation on the web.	The issue of each work is carried out within 2 hours
Applications *2.* Determination family and calculating the degree of mobility for different mechanisms and spatial plane		
Applications *3.*Obtaining replacement mechanism for coupling mechanisms plane containing higher grade 4th. The breakdown mechanisms of the structural groups		
Applications *4.*Synthesis and analysis of the bar kinematic mechanisms. Graphic and analytical methods.		
Applications *5.* Experimental study of generating different types of curves profiling technique used in teeth profiling wheel.		
Applications 6. Determination of Transmission Rate at Ordinary Gear Units. Gear box		
Applications 7. Determination of transmission ratio at planetary gears. Differential		

Bibliography

[1] Maros D. and collectively Mecanisme.Indrumator works, Lito.IPC-N., Cluj, 1984;
[2] Pelecudi, Chr., And collectively, The analysis algorithms and mechanisms, Ed. Academy Cota 1982 347 215; (30 pieces).
[3] Maros, D., Numerical study of the mechanisms in the flat Ed.Dacia, Cluj, 1986; Share 424 699; (78 pieces).
[4] Manolescu, Ni and collectively Collection of the theory of machines and mechanisms. Ed. Technology, 1963; Vol.1 share 95.879 / 1 (19 pieces).
[5] Hauk, N - Mechanisms: design guidelines, 1997, Univ. Lower Danube Galati, share 487.485 (1 piece) (BCU)

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Course content is consistent with the mechanisms of discipline in other universities in the country and abroad. To better adapt the content subject to the requirements of the labor market, the lecturer had meetings both with representatives of the business community as an employer representative and the holders of discipline in the country in the context of an event specialist called "National Seminar on Mechanisms" held annual, rotating every university in the country.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	- the accuracy and completeness of knowledge; - logical consistency; - the degree of assimilation of specialized language; - that envisage attitudinal aspects: conscientiousness, self-study interest.	* Review written (final exam period) * Active participation in course	60% 10%
10.5 Applications	- ability to work with their knowledge; - ability to apply in practice; - that envisage attitudinal aspects: conscientiousness, self-study interest	* Works written in the form of abstracts of current issues with oral evaluation. * Active participation in carrying out the work.	20% 10%
10.6 Minimum standard of performance			

Date of filling in:		Title Surname Name	Signature
	Lecturer	SL.dr.ing. Emil Teutan	
	Teachers in charge of application	As. dr.ing.. Ianosi Alexander	

Date of approval in the department IF

____

Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering
1.7	Form of education	Full time
1.8	Subject code	26.00

2. Data about the subject

2.1	Subject name			**Mechanics II**			
2.2	Subject area			Theoretical mechanics			
2.3	Course responsible/lecturer			Prof. PhD. Eng. Iuliu NEGREAN - iuliu.negrean@mep.utcluj.ro			
2.4	Teachers in charge of seminars			Lect. PhD. Math. Florina Șerdean- florina.rusu@omt.utcluj.,ro			
2.5 Year of study	2	2.6 Semester	1	2.7 Assessment	E	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 Sem./Lab.:	1/1
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 Sem./Lab.:	14/14

Individual study	hours
Manual, lecture material and notes, bibliography	21
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	
Exams and tests	3
Other activities	0

3.7	Total hours of individual study	44
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Attendance to laboratories is mandatory.

6. Specific competences

Professional competences	To know the following: • Notions about dynamics of absolute and relative motion of material point; • Notions and fundamental theorems in dynamics of systems; • Notions of analytical mechanics. After this course, the students will be capable: 1) Application of fundamental theorems and principles of analytical mechanics; 2) To use software applications concerning dynamics of systems; 3) To analyze and syntheses the data bases concerning dynamics of systems.
Cross competences	Identify the need for continuous training and the effective use of informational and communication as well as training assistance (Internet portals, specialized software, data bases, online courses, etc..) both in Romanian and in an international language

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To master the fundamental principles and general theorems that rules the motion of mechanical systems.
7.2	Specific objectives	Application of the general theorems of dynamics and principles of analytical mechanics for the solving concrete problems.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Fundamental notions and theorems in the dynamics of the material point. The momentum of a material point. The theorem of momentum.	During the teaching process are used classical methods (present the demonstration by writing on the blackboard) for mathematical demonstrations and mechanical diagrams.	The course activities are two hours long and kept one time / week. Students are encouraged to ask questions related to the discussed topics.
2.	The theorem of movement of mass center. The angular momentum for a material point and for a discrete system of material points. The König theorem for angular momentum.		
3.	The theorem of angular momentum for a material point. The central movement. Determination of Binet’s equation. The theorem of angular momentum for a discrete system of material points. The theorem of angular momentum with respect to the mass center.		
4.	The elementary work. The finite work. The work of the internal forces. The kinetic energy for a material point and for a discrete system of material points. The theorem of kinetic energy for a material point and a discrete system of material points.		
5.	The dynamics of relative motion in case of a material point. Basic elements of relative kinematics of a material point. The law of composing the velocities. The law of composing the accelerations (Coriolis’ theorem). The fundamental equation in the dynamics of relative motion.		
6.	The mechanical moments of inertia. Expressions of definition. The variation of mechanical inertia moments with respect to parallel axes (Steiner’s theorem).		
7.	The variation of mechanical inertia moments with respect to concurrent axes. The inertial tensor.		
8.	The dynamics of a rigid body. The kinematic, mass distribution and forces study, necessary for the general dynamics. Fundamental notions and theorems in the dynamics of a rigid body. The momentum of a rigid body. The theorem of movement of mass center for the rigid body.		

9.	The angular momentum of a rigid body. The theorem of angular momentum for a rigid body. The work performed by the forces that act on the rigid body.		
10.	Mechanical power. Mechanical efficiency. The kinetic energy for a rigid body. König's theorem for kinetic energy. The theorem of kinetic energy for a rigid body.		
11.	The dynamics of a rigid body with fixed axis. The kinematic and dynamic study.		
12.	The dynamics of a rigid body with fixed axis. The balancing of rotors. The dynamics of a rigid body with fixed point. The kinematic and dynamic study.		
13.	Analytical mechanics. The inertia force. The reduction torsor of inertia forces. D'Alembert principle.		
14.	Linkages (mechanical links) and displacements in analytical mechanics. The principle of D'Alembert – Lagrange. Lagrange's equations of first type. Lagrange's equations of second kind.		

Bibliography

1. Bălan, Şt., *Probleme de Mecanică,* Editura Didactică şi Pedagogică, Bucureşti, 1977.
2. Ispas, V., ş.a., *Mecanica,* Editura Dacia, Cluj-Napoca, 1998.
3. Negrean, I., ş.a., *Robotică – Modelarea cinematică şi dinamică,* Editura Didactică şi Pedagogică, Bucureşti, 1997.
4. Negrean, I., *Cinematica şi Dinamica Roboţilor • Modelare • Experiment • Precizie,* Editura Didactică şi Pedagogică, Bucureşti, 1999.
5. Negrean, I., Duca, A., Negrean, C., Kacso, K., *Mecanică avansată în robotică,* Editura UT Press, 2008, ISBN 978-973-662-420-9
6. Negrean, I., Mecanică – Teorie şi aplicaţii, UT Press, 2012, ISBN 978-973-662-523-7, 476p.
7. Ripianu, A., *Mecanica solidului rigid,* Editura Tehnică, Bucureşti, 1973.
8. Ripianu, A., Popescu, P., Bălan, B., *Mecanică tehnică,* Edit. Didactică şi Pedagogică, Bucureşti, 1982.
9. Popescu, P., ş.a., *Culegere de Probleme de Mecanică-Statica,* Centrul de multiplicare al Institutului Politehnic din Cluj-Napoca, 1978.
10. Ripianu, A., ş.a., *Culegere de Probleme de Mecanică-Cinematica,* Centrul de multiplicare al Institutului Politehnic din Cluj-Napoca, 1986.
11. Sarian, M., ş.a., *Probleme de mecanică,* Editura Didactică şi Pedagogică, Bucureşti, 1983.
12. Stoenescu, Al., Ripianu, A., *Culegere de probleme de mecanică,* Editura Didactică şi Pedagogică, Bucureşti, 1965.
13. Vâlcovici, V., Bălan, Şt., Voinea, R., *Mecanică teoretică,* Editura Tehnică, Bucureşti, 1968.

8.2. Applications/Seminars		Teaching methods	Notes
1.	Fundamental notions and theorems regarding the dynamics of material systems;	During seminary classes are used classical methods (present the demonstration of an application by writing on the blackboard), all students being invited to participate actively.	The seminary activity is two hours long and is kept once every two weeks.
2.	Fundamental theorems regarding the dynamics of a free material point and a material point subjected to mechanical bounds;		
3.	The dynamics of relative motion of a material point.		
4.	The dynamics of a rigid body with fixed axis. The dynamics of a rigid body in plane parallel motion.		
5.	The dynamics of a rigid with a fixed point.		
6.	D'Alembert Principle.		
7.	The principle of virtual mechanical work. Lagrange's Equations.		

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1. Negrean, I., Mecanică – Teorie şi aplicaţii, UT Press, 2012, ISBN 978-973-662-523-7, 476p.
2. Ripianu, A., Popescu, P., Plitea, N., Ursu, N., Balan B, Marcu , V., Ispas, V., Popa, L., Arghir, M., Sagyebo, L., Mugur, G., *Mecanica. Lucrari de laborator. Indrumător*, Cluj-Napoca, Atel. de multiplicare al Instit. Politehnic, Cluj-Napoca, 1984, 174 pg
3. Bratu, P.P., *Mecanica Teoretică*- Editura IMPULS-Bucuresti-2006.

8.3. Applications/Laboratories		Teaching methods	Notes
1.	Determination of the gravitational acceleration using the mathematical pendulum method;	During laboratory classes experimental methods are used and the obtained results are compared	The laboratory activity is two hours long and is kept once every two weeks.
2.	Highlighting the mechanical effect of the inertial Coriolis force;		
3.	Analytical determination of the mechanical moments of inertia;		
4.	Determination of the axial inertial moments using the physical pendulum method;		

5.	Determination of the axial inertial moments using the rotation motion of a rigid around a fixed axis;	to the theoretical ones. All students are invited to participate actively.	
6.	Determination of the dynamic friction coefficient;		
7.	Determination of the kinetic energy for a plane mechanism.		
Bibliography			

1. Negrean, I., Mecanică – Teorie şi aplicaţii, UT Press, 2012, ISBN 978-973-662-523-7, 476p.
2. Ripianu, A., Popescu, P., Plitea, N., Ursu, N., Balan B, Marcu , V., Ispas, V., Popa, L., Arghir, M., Sagyebo, L., Mugur, G., *Mecanica. Lucrari de laborator. Indrumător*, Cluj-Napoca, Atel. de multiplicare al Instit. Politehnic, Cluj-Napoca, 1984, 174 pg
3. Bratu, P.P., *Mecanica Teoretică*- Editura IMPULS-Bucuresti-2006.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

It is acquired through periodic discussions scheduled by the faculty with employers' representatives.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Exam consists in five subjects of theory and applications.	three hours long written examination	80%
Seminaries	Two tests of applications.	It is evaluated by a mark of between 1 and 10	10%
Laboratories	One test and handing over a file with the applications studied during the semester.	It is evaluated by a mark of between 1 and 10	10%
10.4 Minimum standard of performance			
Minimum of five points at exam and a mark of five at seminary and laboratory.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof. PhD. Eng. Iuliu NEGREAN	
	Teachers in charge of application	Lect. PhD. Math. Florina ȘERDEAN	

Date of approval in the department IF _________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*27*

2. Data about the subject

2.1	Subject name	Heat Treatment					
2.2	Subject area	Heat Treatment					
2.3	Course responsible/lecturer	Conf.dr.ing. Vermeșan Horațiu – Horatiu.Vermesan@imadd.utcluj.ro					
2.4	Teachers in charge of seminars	Conf.dr.ing. Vermeșan Horațiu – Horatiu.Vermesan@imadd.utcluj.ro					
2.5 Year of study	2	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	28	3.5 of which, course:	14	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	20
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	7
Tutoring	4
Exams and tests	3
Other activities	3

3.7	Total hours of individual study	47
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

6. Specific competences

Professional competences	Using basic knowledge in fundamental disciplines for explaining and interpreting theoretical results, theorems, phenomena or processes specific to industrial engineering. To know the theoretical principles of heat treatments (annealing, quenching, tempering, surface treatments) as well as the fundamental elements of their application technology. Using knowledge from basic engineering sciences to explain and interpret the theoretical and experimental results, heat treatments phenomena and processes applied to industrial engineering. Design and management of production processes. Know the main criteria for prescribing heat treatments for different applications taking into account material and demands.
Cross competences	Objective self-evaluation of the need for continuous professional training for insertion into the job market and adaptation to the dynamics of its requirements and for personal and professional development Applying the values and ethics of the engineering profession and the responsible execution of professional tasks under restricted autonomy and qualified assistance. Promoting logical, convergent and divergent reasoning, practical applicability, assessment and self-assessment in decision-making

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Identification of basic concepts, principles and methods of heat treatments. Assimilation by students of the criteria after which heat treatments are prescribed for different applications taking into account the material and the demands.
7.2	Specific objectives	To understand the microstructural transformations that occur in heating and cooling in different steel and cast iron regimes and the implications of the heat treatment regime on the microstructure and properties of the product subjected to these technological operations.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Introduction. Brief history. The role of heat treatment in machines industry. Examples. Classifications. Economic importance of heat treatment.		
Basic operations of heat treatment: heating, holding, cooling. Annealing: homogenous annealing and normalization annealing.		
Annealing: softening (globulisation), recrystallization, stress relief.		

Bulk quenching, quenching methods. Surface quenching. Hardenability.		
Tempering, tempering phases, tempering parameters. Quenching and high tempering. Fragility after tempering.		
Thermochemical heat treatment. Carburizing, nitriding, carbonitriding, nitrocarburizing, sulfizing and sulfocarbonitriding.		
Surface engineering. Ionic implantation. Conversion treatment. Galvanic deposition. Thermal deposition through immersion in melted metals, welding and spraying. Vapour deposition (PVD and CVD methods).		
Bibliography ASM Handbook, Volume 4A: Steel Heat Treating Fundamentals and Processes, ISBN: 978-1-62708-011-8 Vermeșan H., Mudura P., Vermeșan G., Berar A. Bazele teoretice ale tratamentelor termice, Editura Universitășii din Oradea, 2002. Dulămiţă, T. ş. a., Tehnologia tratamentelor termice, EDP, București, 1982.		

8.2. Applications/Seminars	Teaching methods	Notes
Determining of the heating duration for thin/thick heat-treated samples.		
The influence of normalization over the structure and mechanical features of cast steel, plastic deformed steel or overheated steel.		
Continuous quenching of steels.		
Determining steel hardenability through Jomminy.		
Tempering regimes for quenching and tempering steels and tools steel.		
Ion nitriding. Nitrided parts control. Heat treatment for high speed steel. Heat treatment for gears.		
Bibliography Vermeșan H, Negrea G., Ingineria suprafețelor – lucrări practice, Editura Risoprint, Cluj-Napoca ASM Handbook, Volume 4A: Steel Heat Treating Fundamentals and Processes, ISBN: 978-1-62708-011-8		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The content of the subject is a basis for substantiating specialized knowledge regarding the design of heat treatment technologies and surface engineering. The competences acquired through the study of this discipline are indispensable elements in the training of graduates, who will be professors, technologists or research engineers in the field of Industrial Engineering.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade

10.4 Course	Exam	Quiz test max 2h	75%
10.5 Applications	Prescribing heat treatment technology for a specific machine part.	Presentation, max 1h	25%
10.6 Minimum standard of performance			
Correct answer to a min. of 10 questions and get the admitted grade at the practical presentation.			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Conf. dr. ing. Horațiu Vermeșan	
	Teachers in charge of application	Conf. dr. ing. Horațiu Vermeșan	

Date of approval in the department IF ________________________	Head of department IF Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	28.00

2. Data about the subject

2.1	Subject name			Creativity and inventics			
2.2	Subject area			CT2			
2.3	Course responsible/lecturer			Prof. PhD eng. Cornel Ciupan, cornel.ciupan@muri.utcluj.ro			
2.4	Teachers in charge of seminars			Lecturer PhD.eng. Emanuela Pop, emanuela.pop@muri.utcluj.ro			
2.5 Year of study	II	2.6 Semester	I	2.7 Assessment	C	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	28	3.5 of which, course:	14	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	8
Supplementary study in the library, online and in the field	6
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	5
Tutoring	1
Exams and tests	2
Other activities	0

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

6. Specific competences

Professional competences	**C1.2.** Use basic knowledge of fundamental disciplines to explain and interpret theoretical results, theorems, phenomena or processes specific to industrial engineering	
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT2. Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work.	

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Developing general technical skills, creativity, ethics and intellectual property in the context of the development of technical civilization	
7.2	Specific objectives	Assimilation of general technical knowledge. Obtaining creativity skills. Applying ethics and respecting intellectual property.	

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Achievements and technologies that changed the world. General considerations. Early metallurgy. Drive systems. Engines. Electric current - light and strength. Communication systems.	Lecture participatory debate, exposure	
2. The evolution of machine tools and manufacturing systems. Chronological References. From tools to machine tools.		
3. Means and techniques for stimulating creativity. General aspects. Models of creativity.		
4. Intuitive techniques of creativity. Logical-intuitive methods of creativity.		
5. General Aspects of Ethics in Scientific Research.		
6. Industrial property. General considerations. Objects of industrial property.		
7. Case studies on counterfeiting in intellectual property.		

Bibliography

1. Ciupan, C. Creativitate tehnică, Editura Dacia, Cluj-Napoca, 1999.
2. Ciupan, C., Julean D., Galiş M. Istoria tehnicii şi design în context. Elemente de referinţă. Editura UT

PRES, Cluj-Napoca, 2002. 3. Ciupan, C., Ciupan E. Proprietate intelectuală. Editura UT PRES, Cluj-Napoca, 2014.

8.2. Applications/Seminars	Teaching methods	Notes
1. Means and techniques intuitive of creativity	Lecture participatory debate, exposure, report	
2. Conception of new products. Case Study. Product and market analysis. Product design specifications.		
3. Conception of new products. Case Study. Conceptual solutions.		
4. Copyright. Plagiarism and self-plagiarism.		
5. Inventions. Patent documentation		
6. Protection of industrial designs. Brand protection. Case Study		
7. Case Study. Counterfeiting in industrial property		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The course content is consistent with what is done in other universities in the country and abroad.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	correctness and completeness of knowledge; logical consistency; interest to the individual study	written paper: 2 hours active participation	40% 10%
10.5 Applications	ability to work with assimilated knowledge interest to the applications	the writing report active participation	40% 10%
10.6 Minimum standard of performance			
Basic knowledge of the evolution of manufacturing equipment. The main deviations from ethics in scientific research. Knowledge of intellectual property objects. The final credit can be received only if each of the mark's components is fulfilled: 50%			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer	Prof. PhD eng. Cornel Ciupan	
	Teachers in charge of application	Lecturer PhD.eng. Emanuela Pop	

Date of approval in the department IF _________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	UniversitateaTehnică dinCluj-Napoca
1.2 Facultatea	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Limbi Moderne şi Comunicare
1.4 Domeniul de studii	Inginerie industrial (Limba engleză)
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii / Calificarea	Tehnologia Construcţiilor de Maşini
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	29.10

2. Date despredisciplină

2.1 Denumirea disciplinei		Limbi Moderne III Engleză							
2.2 Aria de conţinut		Limbi moderne							
2.3Responsabil de curs									
2.4 Titularul activităţilor de seminar / laborator / proiect		Lect. dr. Cecilia Policsek Cecilia.Policsek@lang.utcluj.ro							
2.5Anul de studiu	2	2.6Semestrul	1	2.7Tipul de evaluare	C	2.8Regimuldisciplinei	DC/DO		

3. Timpul total estimat

3.1 Număr de ore pe săptămână	2	din care: 3.2 curs		3.3 seminar / laborator	2
3.4 Total ore din planul de învăţământ	28	din care: 3.5 curs		3.6 seminar / laborator	28

Distribuţia fondului de timp	ore
Studiul după manual, suport de curs,bibliografie şi notiţe	
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren	
Pregătire seminarii / laboratoare, teme, referate, portofolii şi eseuri	22
Tutoriat	
Examinări	
Alte activităţi..................................	

3.7 Total ore studiu individual	22
3.8 Total ore pe semestru	50
3.9 Numărul de credite	2.0

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	
4.2 de competenţe	Nivel B1 CEFR

5. Condiţii (acolo unde este cazul)

5.1. de desfăşurare a cursului	
5.2. de desfăşurare aseminarului/laboratorului / proiectului	Prezenţa la ore, studiul individual, predarea temelor

6. Competenţele specifice acumulate

Competenţepr	O bună cunoaştere a terminologiei de specialitate şi a convenţiilor lingvistice şi comunicaţionale legate de limbajul tehnic; dezvoltarea deprinderilor de înţelegere a englezei tehnice, la nivel oral sau în scris; utilizarea corectă a limbii engleze în conversatii şi prezentări pe teme tehnice; identificarea rolurilor şi responsabilităţilor în cadrul unei echipe, luarea de decizii, aplicarea tehnnicilor de comunicare în cadrul comunicării în echipă, în limba engleză
Competenţe	Dezvoltarea abilităţii studenţilor de a asimila noţiuni ale discursului academic, în vederea unei bune pregătiri profesionale; dezvoltarea competenţelor de exprimare orală şi în scris, de natură să asigure o adaptare adecvată la o piaţă a muncii diversă din punct de vedere cultural; dezvoltarea de către studenţi a abilităţilor de comunicare interculturală, de asculare a interlocutorilor şi de gândire critică

7. Obiectiveledisciplinei (reieşind din grila competenţelor specific acumulate)

7.1 Obiectivul general al disciplinei	Îmbunătăţirea abilităţilor de comunicare profesională, într-o limbă străină
7.2 Obiectivele specifice	Seminarul are în vedere următoarele obiective: --o utilizare adecvată a termenilor de specialitate --o aplicare corectă a regulilor gramaticale care asigură comunicarea eficientă în contexte profesionale --o bună înţelegere a specificităţii diferitelor tipuri de documente tehnice --îmbunătăţirea deprinderii de a participa la conversaţii pe teme tehnice şi de a susţine prezentări --dezvoltarea abilităţilor de redactare de texte în limba engleză

8. Conţinuturi

8.1 Curs	Metode de predare	Observaţii
1. Introducere generală. Descrierea funcţiilor şi a aplicaţiilor	Prelegerea, conversaţia, exerciţii practice de scriere, studiul de caz, dezbaterea, activităţi în echipă, exerciţii bazate pe soluţionarea de probleme	
2. Explicarea felului în care funcţionează un mecanism. Adaptarea strategiilor discursive la auditoriu		
3. Descrierea materialelor		
4. Descrierea proprietăţilor materialelor		
5. Dezbaterea aspectelor referitoare la calitate		
6. Proiecte studenţi		
7. Limbajul folosit în descrierea formelor părţilor componente şi a caracteristicilor lor		
8. Descrierea tehniciilor de fabricaţie		
9. Limbajul folosit în descrierea desenelor		
10. Referinţa la dimensiuni şi precizie		
11. Referinţa la etape şi proceduri de proiectare		
12. Limbajul folosit în rezolvarea problemelor legate de proiectare		

13. Proiecte studenţi		
14. Test final		

Bibliografie

Eisenbach, I. (2011). *English for Materials Science and Engineering.* Exercises, Grammar, Case Studies. Viewveg + Teubner Verlag.

Hewings, M. (2011). *Advanced Grammar in Use*. Cambridge: Cambridge University Press.

Ibbotson, M. (2010). *Cambridge English for Engineering*. Cambridge: Cambridge University Press.

McCarthy, Michael and Felicity O'Dell (2008). *Academic Vocabulary in Use*. Cambridge: Cambridge University Press

Mya, P., N. Lerner and J. Craig. (2010). *Learning to Communicate in Science and Engineering. Case Studies from MIT.* Cambridge, Mass.: the MIT Press.

"Innovation Is Great"
http://learnenglish.britishcouncil.org/en/britain-great/innovation-great

William, I. (2007). *English for Science and Engineering*. Thomson ELT.

9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

Creşterea potenţialului de angajare în companii care fac uz de limba străină

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs	Test scris + proiecte studenţi		Test scris: 50% Proiecte studenţi: 50%
10.5 Seminar/Laborator			
10.6 Standard minim de performanţă: minim 50% din testul final			

Data completării:	Titulari	Titlu Prenume NUME	Semnătura
	Curs		
	Aplicaţii	Lect. dr. Cecilia Policsek	

Data avizării în Consiliul Departamentului IF __________________________	Director Departament IF Sl.dr.ing. Adrian TRIF
Data aprobării în Consiliul Facultății CM __________________________	Decan Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	29.20

2. Data about the subject

2.1	Subject name			Modern language III French			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer			N/A			
2.4	Teachers in charge of seminars			Assoc.prof.Cristiana Bulgaru,Cristiana.Bulgaru@lang.utcluj.ro			
2.5 Year of study	2	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DC/DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					22
Tutoring					
Exams and tests					
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general French minimum A2-B1 CEFR

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. **Specific competences**

Professional competences	A good command of the relevant vocabulary used in professional contexts, a special focus being placed on listening; development of the ability to understand spoken and written technical French; use of French in conversations and talks on technical topics; improvement of the ability to work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence; developing the students' ability to listen to others, as well as their critical thinking

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	The students should develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --prove better ability to listen for detail in relation to conversations and talks on technical topics --prove better ability to speak and write about topics related to their specialization

8. **Contents**

8.1. Lecture (syllabus)		Teaching methods	Notes
8.2. Applications/Seminars		Teaching methods	Notes
1.	General introduction. Describing technical functions and applications.	Interactive teaching, working in pairs and groups, student projects, debates, focus on problem-solving approaches	
2.	Explaining how technology works. Explaining technical concepts to non-specialists		
3.	Describing specific materials		
4.	Specifying and describing properties		
5.	Discussing quality issues		
6.	Language used to describe component shapes and features		
7.	Explaining and assessing manufacturing techniques 1		
8.	Explaining and assessing manufacturing techniques 2		
9.	Discussion dimensions and precision		
10.	Discussing design phases and procedures		
11.	Resolving design problems		
12.	Student projects 1		
13.	Student projects 2		
14.	Final test		

Bibliography

1.Miquel, C., *Grammaire en dialogues – niveau intermédiaire*, Ed. Clé International, 2007
2. Parizet, M.L., Grandet, E., Corsain, M., *Activités pour le Cadre Européen Commun de Référence – Niveau B1*, Ed.

Clé International, 2005 3. Teşculă, C., *Le français de la technique : lexique, grammaire et structures du discours*, Ed. UTPRES, Cluj-Napoca, 2005

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in English in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test + student projects	Final test: 50 % Student projects: 50%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Data completării:	Titulari	Titlu Prenume NUME	Semnătura
	Curs		
	Aplicații	Assoc. Prof. Cristiana Bulgaru, Ph. D	

Data avizării în Consiliul Departamentului IF ________________________	Director Departament IF Sl.dr.ing. Adrian TRIF
Data aprobării în Consiliul Facultății CM ________________________	Decan Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	29.30

2. Data about the subject

2.1	Subject name			Modern Languages III German			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer			N/A			
2.4	Teachers in charge of seminars			Lect.dr. M Tripon Ph.D, Tripon.Mona@lang.utcluj.ro			
2.5 Year of study	2	2.6 Semester	2	2.7Assessment	C	2.8 Subject category	DC/ DO

3. Estimated total time

3.1Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	8
Supplementary study in the library, online and in the field	
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	
Exams and tests	4
Other activities	

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	

4.2	Competence	Knowledge of general German minimum A2 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	A good command of the relevant vocabulary used in professional contexts; development of the ability to understand spoken and written technical German; use of German in conversations and talks on technical topics; improvement of the ability to work in teams
competence	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --prove better ability to listen for detail in relation to conversations and talks on technical topics --prove better ability to speak and write about topics related to their specialization

8. Contents

8.1.Lecture (syllabus)		Teaching methods	Notes
8.2.Applications/Seminars		Teaching methods	Notes
1.	General introduction. Describing types of technical problems	Interactive teaching, working in pairs and groups, student projects, debates, focus	
2.	The Manufacturing Process		
3.	Machine Tools		
4.	Household Appliances – Users Manual		
5.	Types of Engines		
6.	The Engines of the Future		

7.	The Automobile: Makes, Manufacturers	on problem-solving approaches	
8.	The Automobile: Components		
9.	Purchasing a Car – Negotiations		
10.	Accidents and Incidents		
11.	Discussing regulations and standards		
12.	Student projects		
13.	Final test – written		
14.	Final test- oral		

Bibliography

1. Dengler/Rusch/Schmitz/Sieber: Netzwerk A1-B1. Deutsch als Fremdsprache. Langenscheidt, 2014
2. Dreyer/Schmitt: Lehr-und Übungsbuch der deutschen Grammatik. München: Hueber Verlag 2000.
3. Fearns/R. Buhlmann: Technisches Deutsch für Ausbildung und Beruf. Lehr-und Arbeitsbuch. Verlag Europa-Lehrmittel, 2013.
4. Tripon M.: Faszination Technik. Sprachtrainer Deutsch für Studenten technischer Universitäten. Editura Napoca Star, Cluj-Napoca 2012.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in German in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2Assessment methods	10.3Weight in the final grade
Course			
Applications		Final test + student projects	Final oral test - oral 30 % Final test – written 30% Projects/homeworks: 30% Assiduity 10%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in:		**Title Surname Name**	**Signature**
dd.mm.yyyy	Lecturer		
	Teachers in charge of application	Lect. Mona Tripon, Ph. D.	

Date of approval in the department IF

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Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data related to the programme of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of Study	Industrial Engineering
1.5	Study Level	Bachelor of Engineering
1.6	Programme of study/Qualification	Manufacturing Engineering (English) / Engineer
1.7	Full or part time (Type of attendance)	IF-Full time attendance
1.8	Subject code	30.00

2. Data related to the subject

2.1	Subject name	Probabilities Theory and Statistics									
2.2	Subject area	Mathematics									
2.3	Course responsible	S.l.dr.ing. Vlad Bocăneț *(vlad.bocanet@tcm.utcluj.ro)*									
2.4	Seminar/lab classes/project in charge of	S.l.dr.ing. Vlad Bocăneț *(vlad.bocanet@tcm.utcluj.ro)*									
2.5	Year of study	II	2.6	Semester	2	2.7	Assessment	Coll	2.8	Subject category	DF/DI

3. Total estimated time

3.1	No. of hours per week	2		of which lecture	1		applications	1
3.4	Total no. of hours in the curriculum	28		of which lecture	14		applications	14

Individual study	Hours
Learning from manuals, course notes, bibliography	8
Additional reading and documentation in libraries, electronic platforms and field	
Preparation of seminars/lab classes, assignments, reports, portfolios, essays	12
Tutorial classes	
Exams and tests	
Other activities	2

3.7	Total no. of hours of individual study	22
3.8	Total no. of hours per semester	50
3.9	No. of credit points	2

4. Pre-requisites (where necessary)

4.1	Of curriculum	
4.2	Of competences	

5. Requisites (where necessary)

5.1	To run the courses/lectures	Multimedia equipment
5.2	To run the applications	Computer network and specialized software

6 Specific competences

Professional competences	C 1.1. Recognition of important theorems, principles and basic methods used in probabilities and statistics. C 1.2. Making demonstrations, explanation and interpretation of theoretical results. C 1.3. Application of theoretical statistics to specific engineering problems. C 1.4. Solving of medium difficulty problems and interpreting the results. C 1.5. Choosing the appropriate method for solving problems
Cross competences	CT 1. Application of engineering professional values and ethics and responsibly and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promotion of logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. Responsible execution of professional duties. CT 2. Activity completion and exertion of teamwork specific roles on different hierarchical levels. Promotion of initiative, dialogue, cooperation, positive attitude and respect towards others, diversity and multiculturalism and continuous self-improvement. Communication and teamwork CT 3. Objective self-evaluation of the need of continuous training for labour market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication. Awareness of the need for continuous self-improvement.

7 Subject objectives (according to the specific competences)

7.1	General subject objective	To do calculations, demonstrations and applications for manufacturing engineering specific tasks with statistics
7.2	Specific objectives	To know probability theory basics To know statistical methods, indicators and repartition functions To evaluate and interpret statistical data

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	General notions of probability theory: Overview, objectives, course syllabus, definitions and fundamental concepts (event, experiment, probability, operations with probabilities, scrap factor) Bayes rule.	Presentation, discussions	Video projector
2	Descriptive statistics: Definitions and basic concepts (population, characteristic), statistical data presentation (tables, charts, indexes), frequencies, histograms. Applications.		
3	Random variables, distribution functions: Discrete and continuous random variables, discrete distribution functions (binomial, hypergeometric, Poisson), continuous distribution functions (normal, Student, Chi 2, Fischer). Applications: point estimates, range estimates (mean, dispersion, two average differences).		
4	Estimation and estimators: Point estimates, range estimates (average, dispersion, two average differences). Applications.		
5	Statistical methods – hypothesis testing: Average, dispersion, two average equality, two dispersion equality hypothesis testing. Applications.		
6	Correlation and regression: Ways of determining correlation, linear and polynomial regression. The ANOVA method. Applications.		
7	Applications and case studies: The Six Sigma Method, Statistical Process Control (SPC)		
8.2. Lab./sem./project classes			
1	Collection and basic processing of data	Presentation, applications	PC, MS Excell
2	Determination of location and spread indicators and the graphical representation of data		
3	Removing outliers and determining the scrap coefficient		
4	Estimation of the population parameters		

5	Determination of process capability and creating a control card		
6	Correlation and regression		
7	General knowledge test		

Bibliography
1. Bulgaru,M., Bolboaca, L.,I., - Ingineria calităţii, Managementul calităţii, statistică şi control, măsurări în 3D, Editura Alma Mater, Cluj-Napoca, 2001, ISBN 973-35153-0-0.
2. Bulgaru,M., Ioanoviciu,T., Ioanoviciu,A., - Statistica pentru ingineri, Ingineria calităţii, Aplicaţii, Editura Casa Cartii de Stiinta, Cluj-Napoca, 2009 ISBN 978-973- 133-647-3.
3.Bulgaru, M. – Ingineria calitatii, Curs, www.cermi.utcluj.ro
4. Bulgaru M. – Ingineria calitatii, Lucrari de laborator, www.cermi.utcluj.ro

9. Relationship between subject content and expectations of professional community, professional associations and employers in the field of the study programme

The acquired competences will be necessary to employees that activate in fields like management and manufacturing process planning

10. Assessment

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final mark
Lecture	Solving of 2 problems and answering 5 questions from the class material	Written – 1,5 – 2 hours long	75%
Applications	Solving an application by use of the computer	Practical – 1 hour long	25%
10.4 Minimum performance standard :			
One correctly solved problem and three correct answers to questions			

Date of filling in:		Title Surname Name	Signature
	Lecturer	s.l. dr. ing. Vlad Bocăneț	
	Teachers in charge of application	s.l. dr. ing. Vlad Bocăneț	

Date of approval in the department IF

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Head of department IF
s.l.dr.ing. Adrian Trif

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*32.00*

2. Data about the subject

2.1	Subject name	Mechanisms II					
2.2	Subject area	Mechanisms					
2.3	Course responsible/lecturer	Şef Lucr.dr.ing. Teutan Emil – emil.teutan@mdm.utcluj.ro					
2.4	Teachers in charge of seminars	As. dr.ing. Ianosi Alexandru – alexandru.ianosi@mdm.utcluj.ro					
2.5 Year of study	2	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	75	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	15
Supplementary study in the library, online and in the field	9
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	6
Tutoring	0
Exams and tests	3
Other activities	0

3.7	Total hours of individual study	33
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Mechanics
4.2	Competence	Knowledge of mechanics, physics, mathematics. Practical skills.

5. Requirements (where appropriate)

5.1	For the course	Class amphitheater, equipped with video projector and screen
5.2	For the applications	Work on groups of students (2-3 students), performed on laboratory equipment. Individual work themes. Multimedia

		presentations.

6. Specific competences

Professional competences	**C2.1.** Defining the principles and the methods of basic science industrial engineering field associated with graphics – technical drawing. **C2.2.** Using the knowledge from the basic engineering sciences to explain and interpret the theoretical and experimental results, the drawings and the specific industrial engineering phenomena and processes **C2.3.** Applying the principles and methods from basic science of industrial engineering domain and associated with graphics - technical drawing, for strength calculations, sizing, establishing the technical conditions, establishing correspondence between features and functional role prescribed, and so on, in specific applications of industrial engineering under qualified help. **C2.4.** Appropriate use of the standard assessment criteria and methods from basic engineering sciences, for identification, modeling, experimentation, analysis and assessment of the qualitative and quantitative aspects, phenomena and definitive parameters as well as gathering data, processing and interpretation of the results from specific industrial engineering trials. **C2.5.** Elaboration of professional projects specific to industrial engineering on the basis of combining and usage of knowledge, principles and methods from the field of basic sciences of industrial engineering domain and their association with graphics –technical graphics
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT2.** Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The study of motion of mobile mechanical systems in the absence and in the presence of external stresses (external forces and moments of different types)
7.2	Specific objectives	• Studies on structure optimized mobile mechanical systems adaptable machine tools and industrial manufacturing systems; • Studies on the bar kinematic mechanisms with varying degrees of mobility; • Studies on the kinematics of mechanisms with gears, gear systems and planetary ordinary.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Lecture 1. Cam mechanisms. Introduction. Classification.	- Presentation classical themes, - Presentation using the projector, blackboard exposure - Experiment exemplary - Interactive course involving students on topics pre announced	The issue of each work is carried out within 2 hours
Lecture 2. Cinematic analysis of cam mechanisms		
Lecture 3. Synthesis of cam mechanisms. Motion laws of the camshaft mechanism		
Lecture 4. Determination of the radius of the cam ring		
Lecture 5. Determination of the theoretical and practical profile of the cams		
Lecture 6. Intermittent Motion Mechanisms		
Lecture 7. Cineto-static mechanisms. Forces and moments that act on the mechanisms		
Lecture 8. Determination of inertia forces		
Lecture 9. Determination of reactions in kinematic couplings without taking into account the friction forces		
Lecture 10. Determination of reactions in kinematic couplings taking into account friction forces		
Lecture 11. Balancing the moving masses of rotation		

Lecture 12. Static balancing of planar mechanisms		
Lecture 13. Movement of mechanisms under the action of given forces. Equations and movement phases of machines		
Lecture 14. Irregularities in Machine Movement		

Bibliography

[1] Handra-Luca, V., Mechanisms, Lito. IPC-N, Cluj-Napoca, 1980. Share 313 132 (181 pieces)
[2] Handra-Luke, V., Transmission functions in the study of mechanisms, Ed.Academiei, Bucharest, 1983; Share 367 471 (213 pieces)
[3] Handra-Luca, V., Stoica, IA, Introduction to the theory of mechanisms, Ed.Dacia, Cluj, Vol. I-1982, Number 355 341/1 (281 units); Vol. II, 1983, Number 355 341/2 (190 units).
[4] Ardelean, I., Handra-Luke, V., Synthesis mechanisms of technological equipment, Ed.MEDIAMIRA, Cluj Napoca 2000 share 497 125 (88 pieces)
[5] Teutan. E. Modeling and simulation mechanisms with special topology, Ed. Risoprint, 2018

8.2. Applications/Seminars	Teaching methods	Notes
Applications 1. Experimental study on the synthesis of the cam mechanism and oscillating stick. Raising the space variation chart	Applications exemplary; - Comments by breakdowns of the results of experiments; - Modeling, simulation demonstration; - Using specialized software applications; - Documentation on the web.	The issue of each work is carried out within 2 hours
Applications 2. Obtaining the theoretical and practical profile with a cam mechanism and a translation sticker		
Applications 3. Experimental study on the crossing mechanisms of Malta		
Applications 4. Determination of inertial forces by inertial force torsion method and static mass concentration method		
Applications 5. Determination of reactions in kinematic couplings in plane mechanisms		
Applications 6. Static Balancing of Discs. Balancing the rotors using the compensator system		
Applications 7. Experimental determination of worm gear reducer efficiency		

Bibliography

[1] Maros D. and collectively Mecanisme.Indrumator works, Lito.IPC-N., Cluj, 1984;
[2] Pelecudi, Chr., And collectively, The analysis algorithms and mechanisms, Ed. Academy
Cota 1982 347 215; (30 pieces).
[3] Maros, D., Numerical study of the mechanisms in the flat Ed.Dacia, Cluj, 1986; Share 424 699; (78 pieces).
[4] Manolescu, Ni and collectively Collection of the theory of machines and mechanisms.
Ed. Technology, 1963; Vol.1 share 95.879 / 1 (19 pieces).
[5] Hauk, N - Mechanisms: design guidelines, 1997, Univ. Lower Danube Galati, share 487.485 (1 piece) (BCU)

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Course content is consistent with the mechanisms of discipline in other universities in the country and abroad. To better adapt the content subject to the requirements of the labor market, the lecturer had meetings both with representatives of the business community as an employer representative and the holders of discipline in the country in the context of an event specialist called "National Seminar on Mechanisms" held annual, rotating every university in the country.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	- the accuracy and completeness of knowledge; - logical consistency; - the degree of assimilation of specialized language; - that envisage attitudinal aspects: conscientiousness, self-study interest.	* Review written (final exam period) * Active participation in course	60% 10%
10.5 Applications	- ability to work with their knowledge; - ability to apply in practice; - that envisage attitudinal aspects: conscientiousness, self-study interest	* Works written in the form of abstracts of current issues with oral evaluation. * Active participation in carrying out the work.	20% 10%
10.6 Minimum standard of performance			

Date of filling in:		Title Surname Name	Signature
	Lecturer	SL.dr.ing. Emil Teutan	
	Teachers in charge of application	As. dr.ing.. Ianosi Alexander	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. **Data about the program of study**

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	34

2. **Data about the subject**

2.1	Subject name	FLUID MECHANICS					
2.2	Subject area	FLUID MECHANICS					
2.3	Course responsible/lecturer	dr.ing. Corina Giurgea – Corina.Giurgea@termo.utcluj.ro					
2.4	Teachers in charge of seminars	dr.ing. Corina Giurgea – Corina.Giurgea@termo.utcluj.ro					
2.5 Year of study	II	2.6 Semester	IV	2.7 Assessment	Ex	2.8 Subject category	DD/DI

3. **Estimated total time**

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	7
Supplementary study in the library, online and in the field	6
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	3
Exams and tests	3
Other activities	

3.7	Total hours of individual study	33
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. **Pre-requisites (where appropriate)**

4.1	Curriculum	Compulsory: Basics in physics, mathematics and mechanics
4.2	Competence	Ability to: calculate/ plot and interpret graphs/ identify, explain and use the basics principles of physics and mechanics

5. **Requirements (where appropriate)**

5.1	For the course	Multi-media projector, Internet access, Blackboard

5.2	For the applications	Laboratory worksheets filled in for each laboratory class

6. Specific competences

Professional competences	C2.2. Using the knowledge concerning the fluid mechanics and other basic engineering sciences to explain and interpret the theoretical and experimental results, the drawings and the specific manufacturing engineering phenomena and processes C2.3. Applying the principles and methods from fluid mechanics and other basic science of engineering domain for strength calculations, sizing, establishing the technical conditions, establishing correspondence between features and functional role prescribed, and so on, in specific applications of manufacturing engineering under qualified help. C2.4. Appropriate use of the standard assessment criteria and methods from basic engineering sciences, for identification, modeling, experimentation, analysis and assessment of the qualitative and quantitative aspects, phenomena and definitive parameters as well as gathering data, processing and interpretation of the results from specific manufacturing engineering trials.
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT3. Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Acquiring knowledge of the fundamental concepts, principles and equations of fluid mechanics and practicing them through solving some problems / technical applications
7.2	Specific objectives	After the completion of this course, students will be able: • to use the equipment they will encountered or working with during the practical activities developed in the Fluid Mechanics Lab classes: • to measure fluid/fluid flow parameters • to analyse and solve a variety of problems involving fluid flows as well as to explain and discuss the results to calculate/design a simple flow loop

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Introduction. The concept of fluid. Forces in fluid mechanics. Properties of the fluids I. Pressure definition	EdModo Platform + Interactive lectures complimented by many practical	Exploit the movies images and interactivity (reference to [6] and [7])
2. Properties of the fluids II. Compressibility of fluids. The State equation. Surface tension		

3. Properties of the fluids III. Viscosity. Vapor pressure and cavitation phenomenon	examples	
4. Fluid statics I. Pressure variation in a fluid at rest. Measurement of pressure. Manometry		
5. Fluid statics II. Hydrostatic force on plane surfaces. Hydrostatic force on curved surfaces		
6. Fluid statics III. Buoyancy. Stability of immersed and floating bodies		
7. Fluid kinematics. Velocity field. Pathlines and Streamlines. Classification of flows. The flowrate. Instruments and methods for measurement of flowrates		
8. Inviscid flows. The continuity equation. Bernoulli equation and applications		
9. Inviscid flows. Linear momentum equation. Application of the linear momentum equation		
10. Viscous flow in pipes. Major and minor losses in pipes flow		
11. Dimensionless groups, Similarity and Model Development in Fluid Mechanics		
12. Turbomachines. Centrifugal pumps. System characteristics and pump selection		
13. Basics on hydraulic power systems		
14. Trends in complex fluids engineering		

Bibliography

1. Giurgea C., Lecture Notes in Fluid Mechanics (e-version), UTPRESS Cluj Napoca, 2016, ISBN 978-606-737-176-5
2. http://www.slideshare.net/ArchieSecorata/fluid-mechanicsfundamentals-and-applications-by-cengel-cimbala-3rd-c2014-txtbk
3. Munson B.R., Young D.F., Okiishi T.H., Fundamentals of Fluid Mechanics, Fifth edition, John Wiley &son, 2006
4. Munson B.R., Young D.F., Okiishi T.H., Fundamentals of Fluid Mechanics. Student Solutions Manual and Study Guide, Fifth edition, John Wiley &son, 2006
5. Evett J.B., Cheng Liu, 2500 Solved Problems in Fluid Mechanics and Hydraulics, McGraw-Hill, 1989
6. Homsy G.M. et all, Multimedia Fluid Mechanics (DVD), Second edition, Cambridge
7. Different documents posted to Edmodo Platform

8.2. Applications/Seminars	Teaching methods	Notes
1. Dimensions and units. Dimensional Homogeneity and units. Systems of units. Unit conversion	Indoor labs Investigation Experiments	Selected additional problems solving
2. Establishing the compressibility factor and the bulk modulus of one fluid		
3. Measuring the viscosity of fluids by using the Hoppler apparatus and the Rheotest apparatus. Understanding the effect of temperature on the viscosity.		
4. Observation of the cavitation phenomenon in a liquid		
5. Measuring the energy losses in pipes and bends. Investigating the effects of laminar and turbulent flow regimes		

6. Establishing the characteristics/performances (head, power, efficiency /flow rate) of a centrifugal pump. Series and Parallel pumps		
7. Establishing the operating characteristics of a Pelton turbine		

Bibliography

1. Banyai D., Giurgea C., Marcu L., Nascutiu L., Opruta D., Vaida L., *Mecanica Fluidelor – Lucrari Practice*, U.T. Press, Cluj Napoca, 2014, ISBN 978-973-662-934-1
2. Armfield _ Engineering Teaching&Research Equipment Instruction Manual
3. Munson B.R., Young D.F., Okiishi T.H., Fundamentals of Fluid Mechanics. Student Solutions Manual and Study Guide, Fifth edition, John Wiley &son, 2006
4. Evett J.B., Cheng Liu, 2500 Solved Problems in Fluid Mechanics and Hydraulics, McGraw-Hill, 1989

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Nowadays the presence of fluids in technological devices is ubiquitous, starting from power systems to artificial heart. In order to predict the fluids motion, a future engineer not only should be familiar with the basic principles of fluid mechanics but should also have a deeper physical insight into the behaviour of fluids. In particular, “the majority of engineers who are not fluid dynamicists still will need to interact, on a technical basis, with those who are quite frequently;and a basic competence in fluid dynamics will make such interactions more productive”(J.McDonough, Lectures in Elementary Fluid Dynamics: Physics,Mathematics and Applications, University of Kentucky, 2009)

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The ability to answer the theoretical questions and the problem-solving skills	Written final test (FT)	50%
10.5 Applications	The ability to answer to questions regarding the instruments and procedures used in laboratory classes + Activity during the lab classes	Laboratory sheet filling+ activity during laboratory classes appreciation (LA) L=(LT+LA)/2 with LT≥5 and LA≥5	30%
10.6 Homework	The familiarity and ability to work on a Fluid Mechanics subject The ability to work in team (groups of 4-5 students) and to make a presentation/report on a subject related with Fluid Mechanics or to solve a certain type of problems	Oral presentation/report/portfolio + Activity on the Edmodo platform	20%

10.6 Minimum standard of performance
The final mark N=FT+L +H will be determined using the weighting above. The final credit can be received only if each of the mark's components is fulfilled: N≥5; FT≥5; H≥5 Mandatory requirement: A pass mark (of minimum 5) at each Laboratory activity (LT and LA) is compulsory for taking the final written test.

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Corina Giurgea	
	Teachers in charge of application	Corina Giurgea	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	35.00

2. Data about the subject

2.1	Subject name			**Machine Elements I**				
2.2	Subject area			Machine Elements				
2.3	Course responsible/lecturer			Prof.PhD.Eng. Barleanu Corina; Corina.Barleanu@omt.utcluj.ro				
2.4	Teachers in charge of seminars			Asist.Dr.Eng. Crisan Horea, Horea.Cristan@outo.utcluj.ro				
2.5 Year of study	II	2.6 Semester	4	2.7 Assessment	E	2.8 Subject category	DD/DI	

3. Estimated total time

3.1 Number of hours per week	5	3.2 of which, course:	3	3.3 applications:	1+1
3.4 Total hours in the curriculum	70	3.5 of which, course:	42	3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	12
Supplementary study in the library, online and in the field	0
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	0
Exams and tests	4
Other activities	0

3.7	Total hours of individual study	30
3.8	Total hours per semester	100
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	Passing the courses: Descriptive Geometry and Mechanical Drawing, Material Science, Computer Programming, Mechanics, Strength of Materials, Tolerances and Dimensional Control
4.2	Competence	Specific professional development of industrial engineering projects based selection, combination and use of knowledge, principles and methods from the field of basic sciences of industrial engineering domain and their association with drawing –technical

		graphics.

5. Requirements (where appropriate)

5.1	For the course	Projector multi-media, blackboard
5.2	For the applications	Equipment from the laboratory "Machine Elements and Tribology"

6. Specific competences

Professional competences	**C2.1.** Defining the principles and the methods of basic science industrial engineering field associated with graphics – technical drawing. **C2.2.** Using the knowledge from the basic engineering sciences to explain and interpret the theoretical and experimental results, the drawings and the specific industrial engineering phenomena and processes **C2.3.** Applying the principles and methods from basic science of industrial engineering domain and associated with graphics - technical drawing, for strength calculations, sizing, establishing the technical conditions, establishing correspondence between features and functional role prescribed, and so on, in specific applications of industrial engineering under qualified help. **C2.4.** Appropriate use of the standard assessment criteria and methods from basic engineering sciences, for identification, modeling, experimentation, analysis and assessment of the qualitative and quantitative aspects, phenomena and definitive parameters as well as gathering data, processing and interpretation of the results from specific industrial engineering trials. **C2.5.** Elaboration of professional projects specific to industrial engineering on the basis of combining and usage of knowledge, principles and methods from the field of basic sciences of industrial engineering domain and their association with graphics –technical graphics **C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to the mechanical area.. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the mechanical area.. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the mechanical area. **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to mechanical area. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the mechanical area.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Mechanical design principles. Design, manufacture & assembly of basic machine elements.
7.2	Specific objectives	To know the machine components (mechanisms and general machine elements, respectively) from the construction, calculus

		end design point of view. To know the fundamental design principles used in machine building field. To understand the functional role of the machine elements, the movement and load transmitting modality, and their calculus principles, respectively. To evaluate correctly the loading of the machine elements and the influence factors

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Machine elements. Design of mechanical systems. Machine elements. Classification. Threaded fasteners (assemblies with screws). Basic terms and definitions. Forces and torques in threaded assemblies Additional loaded in screws. Efficiency of the threaded assemblies.	Oral presentation, notes on blackboard and multimedia presentation, Completing the course with helpful lecture notes	Students are encouraged to ask questions, interactive course
2.	Main mechanical stress in the screw and nut. Prestress assembly (the issue of initial tightening). The telescopic screws (Differential screws). Ball screws. Thread-locking devices.		
3.	Shaft – hub assembly. Keys assembly. Assembly with parallel key. Stress in key and keyway. Woodruff key assembly. Feather key. Taper key. Splined assembly.		
4.	Pins assemblies. Construction and functioning Bolts assemblies. Construction and functioning.		
5.	Self-tightening assemblies. Press joints.		
6.	Elastic bracelet assembly. Polygonal assembly.		
7.	Springs. Base elements. Helicoidally Springs. Lamelar (Cantilever) Springs.		
8.	Torsional Springs. Spindles and axles		
9.	Shafts.		
10.	Transmission with toothed wheels. Gears. Introduction. Causes of destruction gear. Materials used in toothed wheel construction.		
11.	Spur gear. Calculation of cylindrical spur gears. Forces in the cylindrical spur gear. Strength of cylindrical gears with straight teeth (Spur gear). Contact stress		
12.	Spur gear. Bending stress.		
13.	Helical gear. Calculation of cylindrical helical gears. Forces in the cylindrical helical gear.		
14.	Strength of cylindrical gears with inclined teeth. Contact stress. Bending stress. Applications: Model of Open book exam method.		

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16. Belcin, O., Pustan, M. (2008) ORGANE DE MAŞINI. RULMENŢI. ANGRENAJE –Probleme rezolvate. Ed. Risoprint, Cluj-Napoca, ISBN 978-973-751-871-2

8.2. Applications/Seminars		**Teaching methods**	**Notes**
1.	Presentation Laboratory of Machine Elements, the requirements of laboratory work. Work safety measures.	Practical work in the laboratory, Interpretation of experimental results, Calculation examples	Students are asked and encouraged to ask questions, interactive activity
2.	Determining the friction coefficients of screw assemblies. Examples of calculus		
3.	The efficiency of threads in motion; Determining the efficiency of ball screws. Examples of calculus		
4.	Assemblies with parallel keys. Spline assemblies. Examples of calculus		
5.	Studies regarding elastic bracelets assemblies. Experimental study of press joints. Examples of calculus		
6.	Reestablishing the dimensional parameters of external spur gear trains		
7.	Reestablishing the dimensional parameters of external helical gear trains. Finalizing the lab works		
8.3 Design project: Design of the screw-nut mechanism from the structure of an mechanism , for the following dates: - maximum working load F = __________ N, - maximum stroke h = ________ mm The project will include: 1. Technical memo 2. Computation memo		Project work, computing and graphical part	Interactive activity

3. Drawings: Assembly drawing (scale 1: 1) and execution drawing for screw and nut		
Introduction to design methodology. The theme of the project. Stages of work. Choosing constructive solutions for the project theme. Choosing constructive solutions for screw, nut, body, etc. Choice of materials Determining the forces that load the elements of the mechanism and establish the coupling reactions (the distribution diagram of the forces and moments on the mechanism elements). Calculation of the motion screw Calculation of the nut. Preliminary assembly drawing Calculation of the body (the dimensions of the body are adopted constructively). Calculation of drive mechanism. Cup Calculation. Continue the overall drawing Calculation of efficiency. Complete the drawing. Execution drawings Final written test for examination of the project work		

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1. Sucala F., Antal A., Belcin O., Birleanu C., Bojan S. s.a. (2008) – Organe de Masini, Mecanisme si Tribologie, Studii de caz, ed. Todesco Cluj-Napoca, 2008, ISBN- 978-973-7695-65-9

2. Belcin O., Birleanu C., Pustan M. (2011) – Organe de Masini, Elemente constructive in proiectare, Cluj-Napoca, 2011, Ed. Risoprint Cluj-Napoca, ISBN 978-973-53-0684-7.

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6. Belcin O., Birleanu C., Pustan M. (2015) – Organe de Masini, Elemente de proiectare, Cluj-Napoca, 2015, Ed. Risoprint Cluj-Napoca, ISBN 978-973-53-1487-3.

7. *** - Organe de mașini. Culegere de standarde

8. http://catomt.utcluj.ro/publications.html

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The tools and sciences, skills are acquired in this course, constitute the foundation for the practice of engineering. And so, at this stage of undergraduate education, it is appropriate to introduce some professional aspects of engineering. These professional studies should integrate and use the tools and the sciences in the accomplishment of an engineering objective.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	The ability to answer to theoretical questions and to solve practical problems.	The exam consists in solving some applications in “open book” method	Exam (mark E); 80% E

	All the subjects from the exam are mandatory.		
Applications	The presence at laboratory is compulsory (100%). The activity during project and lab classes is appreciated	Lab will be completed with providing a portfolio of works and ends with a mark. The project work will be accompanied by a final written test and it's have separated mark.	Lab mark (mark L); 5% L Project mark (mark P); 15% P
10.4 Minimum standard of performance			
Final grade: N = 0.8E + 0.05L + 0.15P The final credit can be received only if each of the mark's components is fulfilled: Passing the exam if: N≥5; E≥5; P≥5; L≥5.			

Date of filling in	Lecturer	Teachers in charge of seminars
08.12.2018	Prof.PhD.Eng. Birleanu Corina	Prof.PhD.Eng. Corina Birleanu Asist.PhD.Eng. Crisan Horea

Date of approval in the department
11.12.2018

Head of department
Prof.PhD.Eng. Iuliu NEGREAN

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof.PhD.Eng. Birleanu Corina	
	Teachers in charge of application	Asist.PhD.Eng. Crisan Horea	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	36.00

2. Data about the subject

2.1	Subject name			Quality of Engineering and Management			
2.2	Subject area			Quality Management			
2.3	Course responsible/lecturer			Prof. dr. ing. Marius Bulgaru (marius.bulgaru@tcm.utcluj.ro)			
2.4	Teachers in charge of seminars			s.l. dr. ing. Vlad Bocăneț (vlad.bocanet@tcm.utcluj.ro)			
2.5 Year of study	II	2.6 Semester	2	2.7 Assessment	V	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	1
Supplementary study in the library, online and in the field	2
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	
Exams and tests	2
Other activities	

3.7	Total hours of individual study	19
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Must be present at application work

6. **Specific competences**

Professional competences	C6.1. Defining the concepts, theories, methods and basic principles for planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment C6.2. Using the basic knowledge for explanation and interpretation the issues that arise in planning, management and usage of the manufacturing processes and systems on classic machines and/or CNC as well as in quality assurance and product ascertainment. C6.3. Applying of basic principles and methods for planning, management and usage of manufacturing processes and systems, as well as for quality assurance and product ascertainment, under qualified assistance. C6.4. Proper use of standard evaluation criteria and methods to appreciate the quality, the advantages and the limits of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment including dedicated software C6.5. Elaborating professional projects by using the principles and methods established in the field of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product inspection.
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT2. Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work. CT3. Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	Acquisition of planning competences, leading and assuring the quality of manufacturing processes.
7.2	Specific objectives	1. Assimilation of theoretical knowledge regarding Coordinate Measuring Machines, quality management and non-destructive control methods 2. Obtaining the required skills for CNC program development for coordinate measuring

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
An overview of Quality. The evolution of the concept of quality. General overview, objectives, course unfolding, history, the concept of quality, definitions and standards	Presentation, discussions	Video projector
Quality Management. The client-supplier relationship. Quality indicators. Quality assurance, control and improvement. Strategic management concepts		
Quality management. Planning. Quality policy. Strategic plan. Operational plan. The costs of quality		
Quality management. TQM notions. The concept of Zero Defects. The concept of Six Sigma		
Coordinate measuring. Tactile machines and equipment		
Coordinate measuring. Measurement techniques and strategies		
Coordinate measuring. Non contact measurement		
Non-destructive control. Penetrating liquids. Control with magnetic particles		
Non-destructive control. Acoustic testing. Testing with Eddy currents. Radiography. Computer Tomography.		
Quality instruments. The QFD method		
Quality instruments. The FMEA method		
Product reliability		
Equipment maintenance. Predictive maintenance.		
The electric measurement of mechanical quantities		

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Bulgaru, M. – Ingineria calitatii, Curs, www.cermi.utcluj.ro

8.2. Applications/Seminars	Teaching methods	Notes
Coordinate measuring with Calypso: system setup		
Coordinate measuring with Calypso: measuring of linear and angular dimensions		
Coordinate measuring with Calypso: determining form and position deviations		
Coordinate measuring with GOM (part 1)		
Coordinate measuring with GOM (part 2)		
Measuring of mechanical measures with LabVIEW: Forces		
Measuring of mechanical measures with LabVIEW: Displacements		
Measuring of mechanical measures with LabVIEW: Vibrations		

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Bulgaru M. – Ingineria calitatii, Lucrari de laborator, www.cermi.utcluj.ro

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The acquired competences will be necessary to employees that activate in quality assurance and control service sector and to technologist engineers

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Class material test	Written assessment – 1,5 - 2 hours	75%
10.5 Applications		Practical assessment – 1 hour	25%
10.6 Minimum standard of performance			
One solved problem and correct answers to six questions.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof. dr. ing. Marius Bulgaru	
	Teachers in charge of application	s.l. dr. ing. Vlad Bocăneț	

Date of approval in the department IF

____

Head of department IF
s.l.dr.ing. Adrian Trif

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	37.00

2. Data about the subject

2.1	Subject name			Finite Element Method			
2.2	Subject area			Mathematics			
2.3	Course responsible/lecturer			Dan-Sorin COMŞA, Associate Professor, Dr.Eng. – dscomsa@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Emilia SABĂU, Senior Lecturer, Dr.Eng. – emilia.sabau@tcm.utcluj.ro			
2.5 Year of study	II	2.6 Semester	4	2.7 Assessment	C	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	1	3.3 applications:	2
3.4 Total hours in the curriculum	42	3.5 of which, course:	14	3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	7
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	0
Exams and tests	2
Other activities	0

3.7	Total hours of individual study	33
3.8	Total hours per semester	75
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Attending the courses: Calculus, Linear Algebra, Analytical and Differential Geometry, Applied Mathematics, Mechanics, Strength of Materials, and Computer-aided Graphics
4.2	Competence	-

5. Requirements (where appropriate)

5.1	For the course	Multimedia projector, blackboard
5.2	For the applications	Availability of computers having installed the CAD program SolidWorks and the finite element analysis module SolidWorks Simulation

6. Specific competences

Professional competences	C3.1. Describing the basic theories and methods in the field of computer programming and applied informatics specific to machine building technology. C3.2. Using the basic knowledge associated to software programs and digital technologies for explaining and interpret the issues of conceive and computer aided design of products, processes and technologies, in experimental and theoretical investigation of computerized data processing, specific to industrial engineering in general, and particularly in machine building technology. C3.3. Applying basic principles and methods of software programs and digital technologies for programming, database implementation, assisted graphics, modeling, computer aided design of products, processes and technologies, investigation and computerized data processing specific to industrial engineering in general, and particularly to machine building technology. C3.4. Appropriate use of standard assessment criteria and methods to assess the quality, advantages and limitations of software programs and digital technology in order to be used in specific tasks of industrial engineering in general, and particularly machine building technology. C3.5. Elaboration of the professional projects specific to industrial engineering, in general and to machine building technology, in particular, on the basis of selection, combination and use of principles, methods, digital technologies, information systems and software tools dedicated to the field.
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT3. Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	• Fundamental concepts of the finite element method (meshing, finite element approximation, etc.) • Structure of the finite elements models for elasticity

		problems.
7.2	Specific objectives	• Acquiring the fundamental notions of the finite element method (meshing, finite element approximation, etc.) • Understanding the structure of the finite element models associated to elasticity/thermal transfer problems • Use of a finite element analysis software

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Numerical solution of the engineering problems (2 hours) General description of the methods currently used for the numerical solution of the engineering problems (finite difference method, finite element method, boundary element method). Comparative analysis of the advantages and disadvantages		
2. Basic concepts of the finite element method. Part I (2 hours) Presentation of the main concepts used by the finite element method: finite element, node, shape functions. Exemplification for the case of a one-dimensional problem (perfectly flexible cable loaded by its own weight). Analytical solution. Defining the structure of the finite element model associated to the illustrative problem		
3. Basic concepts of the finite element method. Part II (2 hours) Solution of the finite element model associated to the illustrative problem referring to the perfectly flexible cable loaded by its own weight. Comparison between the analytical and numerical solutions. Presentation of the techniques able to improve the accuracy of the numerical results		
4. Types of finite elements. Part I (2 hours) General classification of the finite elements. Brief description of the most frequently used one-, two- and three-dimensional finite elements. Development of the approximation polynomials associated to the two-dimensional triangular and quadrilateral finite	Theoretical presentation, examples	

elements		
5. Types of finite elements. Part II (2 hours) Development of the approximation polynomials associated to the three-dimensional tetrahedral and hexahedral finite elements. Finite-element approximation of the vector quantities (two- and three-dimensional cases)		
6. Finite element model of elasticity problems (2 hours) Description of the variational finite element model associated to elasticity problems. Structure of the nodal equation set describing the mechanical equilibrium of the linearly elastic solids		
7. Finite element model of some particular elasticity problems: plane stress, plane strain and axisymmetric problems (2 hours) Particular formulations of the finite element elasticity model corresponding to the plane stress, plane strain and axisymmetric problems. Applicative examples that can be reduced to such types of elasticity problems		

Bibliography

1. Henwood, D., Bonet, J. Finite Elements. A Gentle Introduction. Londra: MacMillan, 1996.
2. Hutton, D.V. Fundamentals of Finite Element Analysis. New York: McGraw-Hill, 2004.
3. Rao, S.S. The Finite Element Method in Engineering. New York: Elsevier, 2004.
4. Zienkiewicz, O.C., Taylor, R.L. The Finite Element Method, vol. I. New York: McGraw-Hill, 1989.

8.2. Applications/Seminars	Teaching methods	Notes
1. General presentation of the finite element analysis module (2 hours)	Solution of applicative problems, discussions	
2. Analysing the elastic response of a part subjected to mechanical loads – Part I (2 hours)		
3. Analysing the elastic response of a part subjected to mechanical loads – Part II (2 hours)		
4. Analysing the elastic response of a part subjected to mechanical loads – Part III (2 hours)		
5. Analysing the elastic response of a part subjected to mechanical loads – Part IV (2 hours)		
6. Analysing the elastic response of a part subjected to mechanical loads – Part V (2 hours)		
7. Performing modal analyses (eigenfrequencies and		

eigenmodes) – Part I (2 hours)		
8. Performing modal analyses (eigenfrequencies and eigenmodes) – Part II (2 hours)		
9. Analysis of elastic buckling – Part I (2 hours)		
10. Analysis of elastic buckling – Part II (2 hours)		
11. Analysis of steady thermal transfer (2 hours)		
12. Analysis of non-steady thermal transfer (2 hours)		
13. Finite element analysis of assemblies consisting in several parts – Part I (2 hours)		
14. Finite element analysis of assemblies consisting in several parts – Part II (2 hours)		

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1. Nudehi, S., Steffen, J.R. Analysis of Machine Elements Using SolidWorks Simulation 2017. Mission: SDC Publications, 2017.
2. Shih, R. Introduction to Finite Element Analysis Using SolidWorks Simulation 2017. Mission: SDC Publications, 2017.
3. Verma, G., Weber, M. SolidWorksSimulation 2017 Black Book. Eastman: CADCAMCAE Works, 2016.
4. Petrova, R.V. Introduction to Static Analysis Using SolidWorks Simulation. Boca Raton: CRC Press, 2015.
5. Akin, J.Ed. Finite Element Analysis Concepts via SolidWorks. New Jersey: World Scientific, 2009.
6. *** SolidWorks Simulation Online Tutorials. Electronic documentation.
7. *** SolidWorks Simulation Online Help. Electronic documentation.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The finite element method is widely used both in the constructive and technological design activities. During the last four decades, this numerical method has become a standard tool in almost all engineering fields.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Ability to answer theoretical questions and solve applicative problems	Written test (mark T)	Mark T is 50%.
10.5 Applications	Attending the lab is compulsory (100%). Activity during the lab	Evaluation at the end of the lab classes (mark L)	Mark L is 50%.

	work is evaluated.		
10.6 Minimum standard of performance: N = T + L			
The credits can be received only if the following conditions are fulfilled: N≥5; T≥5; L≥5.			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Conf.dr.ing. Dan-Sorin COMŞA	
	Teachers in charge of application	Şef lucr.dr.ing. Emilia SABĂU	

Date of approval in the Department of Manufacturing Eng.

____

Head of Department of Manufacturing Engng
Şef lucr.dr.ing. Adrian TRIF

Date of approval in the Faculty of Machine Building

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Modern Languages and Communication
1.4	Field of study	Machine Building (Instruction in English)
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Machine Building
1.7	Form of education	Full time
1.8	Subject code	38.10

2. Data about the subject

2.1	Subject name			Modern Language IV English			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer			N/A			
2.4	Teachers in charge of seminars			Lect. Cecilia Policsek, Ph. D. Cecilia.Policsek@lang.utcluj.ro			
2.5 Year of study	2	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DC/DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					22
Tutoring					
Exams and tests					
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general English minimum B1 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	A good command of the relevant vocabulary used in professional contexts; with a special focus on job application-related communication and documents completed with regard to job application, development of the ability to understand spoken and written technical English; use of English in conversations and talks on technical topics; improvement of the ability to express solutions and work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence, as well as well as of their ability to listen to others and think critically

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --prove better ability to present their skills and speak and write about topics related to their specialization, in job application-related situations --understand the conventions that rule technical communication and job application-related circumstances, in both speaking and writing

8. Contents

<table>
<tr><td colspan="2">8.1. Lecture (syllabus)</td><td>Teaching methods</td><td>Notes</td></tr>
<tr><td colspan="2">8.2. Applications/Seminars</td><td>Teaching methods</td><td>Notes</td></tr>
<tr><td>1.</td><td>General introduction. Describing types of technical problems</td><td rowspan="14">Interactive teaching, working in pairs and groups, student projects, debates, interviews, focus on problem-solving approaches</td><td rowspan="14"></td></tr>
<tr><td>2.</td><td>Discussing the causes of faults</td></tr>
<tr><td>3.</td><td>Discussing repairs and maintenance</td></tr>
<tr><td>4.</td><td>Discussing technical requirements</td></tr>
<tr><td>5.</td><td>Suggesting ideas and solutions. Conventions of professional communication</td></tr>
<tr><td>6.</td><td>Student projects</td></tr>
<tr><td>7.</td><td>Phrases and strategies used to assess feasibility</td></tr>
<tr><td>8.</td><td>Describing improvements and redesigns</td></tr>
<tr><td>9.</td><td>Describing health and safety precautions</td></tr>
<tr><td>10.</td><td>Emphasizing the importance of precautions. Discussing regulations and standards. Written instructions and notices</td></tr>
<tr><td>11.</td><td>Conventions of job application-related documents</td></tr>
<tr><td>12.</td><td>The job interview. Presenting skills and negotiating</td></tr>
<tr><td>13.</td><td>Student projects</td></tr>
<tr><td>14.</td><td>Final test</td></tr>
</table>

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Hewings, M. (2011). *Advanced Grammar in Use*. Cambridge: Cambridge University Press.
Ibbotson, M. (2010). *Cambridge English for Engineering*. Cambridge: Cambridge University Press.
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Innes, J. (2015). *How to Avoid the Most Common Mistakes and Write a Winning CV*. Person
Innes, J. (2015). *The Interview Book: How to Prepare and Perform at Your Best in Any Interview*. Pearson.
Pease, A. & B. (2006). *The Definitive Book of Body Language.* New York, NY: Bantam.
Remacha E. and E. Marco Fabré (2007). *Professional English in Use*. Cambridge: Cambridge University Press.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in English in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test + student projects	Final test: 50 % Student projects: 50%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer		
	Teachers in charge of application	Lect. Cecilia Policsek, Ph. D.	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	38.20

2. Data about the subject

2.1	Subject name		Modern Language IV French				
2.2	Subject area		Foreign Languages				
2.3	Course responsible/lecturer		N/A				
2.4	Teachers in charge of seminars		Assoc.Prof.Cristiana.Bulgaru,Cristiana.Bulgaru@lang.utcluj.ro				
2.5 Year of study	2	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DC/ DO

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:		3.3 applications:	2
3.4 Total hours in the curriculum	28	3.5 of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					22
Tutoring					
Exams and tests					
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general English minimum B1 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	A good command of the relevant vocabulary used in professional contexts; with a special focus on job application-related communication and documents completed with regard to job application, development of the ability to understand spoken and written technical French; use of French in conversations and talks on technical topics; improvement of the ability to express solutions and work in teams
Cross competences	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence, as well as well as of their ability to listen to others and think critically

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --prove better ability to present their skills and speak and write about topics related to their specialization, in job application-related situations --understand the conventions that rule technical communication and job application-related circumstances, in both speaking and writing

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
8.2. Applications/Seminars		Teaching methods	Notes
1.	General introduction. Describing types of technical problems	Interactive teaching, working in pairs and groups, student projects, debates, interviews, focus on problem-solving approaches	
2.	Discussing the causes of faults		
3.	Discussing repairs and maintenance		
4.	Discussing technical requirements		
5.	Suggesting ideas and solutions. Conventions of professional communication		
6.	Phrases and strategies used to assess feasibility		
7.	Describing improvements and redesigns		
8.	Describing health and safety precautions		
9.	Emphasizing the importance of precautions. Discussing regulations and standards. Written instructions and notices		
10.	Conventions of job application-related documents		
11.	The job interview		
12.	Student projects		
13.	Student projects		
14.	Final test		

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1.Miquel, C., *Grammaire en dialogues – niveau intermédiaire*, Ed. Clé International, 2007

2. Parizet, M.L., Grandet, E., Corsain, M., *Activités pour le Cadre Européen Commun de Référence – Niveau B1*, Ed. Clé International, 2005

3. Teşculă, C., *Le français de la technique : lexique, grammaire et structures du discours*, Ed. UTPRES, Cluj-Napoca, 2005

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in French in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course			
Applications		Final test + student projects	Final test: 50 % Student projects: 50%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in: dd.mm.yyyy		Title Surname Name	Signature
	Lecturer		
	Teachers in charge of application	Assoc.Prof.Cristiana Bulgaru, Ph. D.	

Date of approval in the department IF ______________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ______________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Modern Languages and Communication
1.4	Field of study	Machine Building (Instruction in English)
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Machine Building
1.7	Form of education	Full time
1.8	Subject code	38.30

2. Data about the subject

2.1	Subject name			Modern Language IV German			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer			N/A			
2.4	Teachers in charge of seminars			Lect.dr. M Tripon Ph.D, Tripon.Mona@lang.utcluj.ro			
2.5 Year of study	2	2.6 Semester	2	2.7Assessment	C	2.8 Subject category	DC/ DO

3. Estimated total time

3.1Number of hours per week	2	3.2of which, course:		3.3 applications:	2
3.4Total hours in the curriculum	28	3.5of which, course:		3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					8
Supplementary study in the library, online and in the field					
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					10
Tutoring					
Exams and tests					4
Other activities					

3.7	Total hours of individual study	22
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	

4.2	Competence	Knowledge of general German minimum A2 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	A good command of the relevant vocabulary used in professional contexts; development of the ability to understand spoken and written technical German; use of German in conversations and talks on technical topics; improvement of the ability to work in teams
competence	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --prove better ability to listen for detail in relation to conversations and talks on technical topics --prove better ability to speak and write about topics related to their specialization

8. Contents

8.1.Lecture (syllabus)		Teaching methods	Notes
8.2.Applications/Seminars		**Teaching methods**	**Notes**
1.	General introduction.	Interactive teaching, working in pairs and groups, student projects, debates, focus	
2.	Industrial processes		
3.	Discussing types of technical problems, repairs and maintenance		
4.	Equipments and devices: discussing technical requirements		
5.	Suggesting ideas and solutions		
6.	Writing a description. Describing improvements and redesigns		

7.	Student projects – writing a summary	on problem-solving approaches	
8.	Projects evaluation		
9.	Oral presentations - owerview		
10.	Preparing a presentation		
11.	Presenting		
12.	Presenting -Evaluation		
13.	Discussing the CEFRL		
14.	Final test		

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1. Dengler/Rusch/Schmitz/Sieber: Netzwerk A1-B1. Deutsch als Fremdsprache. Langenscheidt, 2014
2. Dreyer/Schmitt: Lehr-und Übungsbuch der deutschen Grammatik. München: Hueber Verlag 2000.
3. Fearns/R. Buhlmann: Technisches Deutsch für Ausbildung und Beruf. Lehr-und Arbeitsbuch. Verlag Europa-Lehrmittel, 2013.
4. Tripon M.: Faszination Technik. Sprachtrainer Deutsch für Studenten technischer Universitäten. Editura Napoca Star, Cluj-Napoca 2012.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in German in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2Assessment methods	10.3Weight in the final grade
Course			
Applications		Final test + student projects	Final oral test - oral 30 % Final test – written 30% Projects/homeworks: 30% Assiduity 10%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer		
	Teachers in charge of application	Lect. Mona Tripon, Ph. D.	

Date of approval in the department IF _________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Modern Languages and Communication
1.4	Field of study	Machine Building (Instruction in English)
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Machine Building
1.7	Form of education	Full time
1.8	Subject code	104.00

2. Data about the subject

2.1	Subject name			Technical German II			
2.2	Subject area			Foreign Languages			
2.3	Course responsible/lecturer			N/A			
2.4	Teachers in charge of seminars			Lect.dr. M Tripon Ph.D, Tripon.Mona@lang.utcluj.ro			
2.5 Year of study	2	2.6 Semester	2	2.7Assessment	C	2.8 Subject category	DC/DFAC

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:		3.3 applications:	3
3.4 Total hours in the curriculum	42	3.5 of which, course:		3.6 applications:	42

Individual study	hours
Manual, lecture material and notes, bibliography	
Supplementary study in the library, online and in the field	
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	
Tutoring	
Exams and tests	
Other activities	

3.7	Total hours of individual study	8
3.8	Total hours per semester	50
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Knowledge of general German minimum A2 (CEFR)

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Class attendance, individual study and homework completion

6. Specific competences

Professional competences	A good command of the relevant vocabulary used in professional contexts; development of the ability to understand spoken and written technical German; use of German in conversations and talks on technical topics; improvement of the ability to work in teams
competence	Development of the students' ability to process academic information and prepare for their career; improved oral and written communication competence, which is to grant a better a better adjustment to a multicultural work environments; sharpening of the students' intercultural communication competence

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students should develop skills to communicate effectively in a foreign language in professional contexts
7.2	Specific objectives	At the end of this seminar, the students will be able to: --use key terms that belong to branches of technology of relevance to their specialization --prove better ability to listen for detail in relation to conversations and talks on technical topics --prove better ability to speak and write about topics related to their specialization

8. Contents

		Teaching methods	Notes
8.1.Lecture (syllabus)		Teaching methods	Notes
8.2.Applications/Seminars		Teaching methods	Notes
1.	Fortschrittliche technologische Verfahren	Interactive teaching, working in pairs and groups, student projects, debates, focus on problem-solving	
2.	Wiefunktionert das? Beschreibung von Geräten. Bewertung von Produkteigenschaften und Funktionalität		
3.	Zukunftstechnologien I		
4.	Zukunftstechnologien II		
5.	Baubeschreibungen		
6.	Verstehen und Verfassen von technischenTexten		
7.	Aussageökonomie und Eindeutigkeit in derFachsprache.		
8.	Die Arbeit im Unternehmen		
9.	Zeit wahrnehmen und organisieren, planen und Termine		

	festlegen.	approaches	
10.	Maßnahmmen zur Verbesserung der Zusammenarbeit. Sprachliche Konventionen		
11.	Berufsausbildung in Deutschland. Das duale System.		
12.	Ferienjobs und Praktika in Deutschland. Bewerbung um einPraktikum im Unternehmen		
13.	SchriftlichePrüfung		
14.	MündlichePrüfung		

Bibliography

1. Dengler/Rusch/Schmitz/Sieber: Netzwerk A1-B1. Deutsch als Fremdsprache. Langenscheidt, 2014
2. Dreyer/Schmitt: Lehr-und Übungsbuch der deutschen Grammatik. München: Hueber Verlag 2000.
3. Fearns/R. Buhlmann: Technisches Deutsch für Ausbildung und Beruf. Lehr-und Arbeitsbuch. Verlag Europa-Lehrmittel, 2013.
4. Tripon M.: Faszination Technik. Sprachtrainer Deutsch für Studenten technischer Universitäten. Editura Napoca Star, Cluj-Napoca 2012.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The improvement of the students' ability to communicate in German in technical contexts is to ensure a successful adjustment to multicultural work environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2Assessment methods	10.3Weight in the final grade
Course			
Applications		Final test + student projects	Final oral test - oral 30 % Final test – written 30% Projects/homeworks: 30% Assiduity 10%
10.4 Minimum standard of performance: satisfactory completion of at least 50% of the final test			

Date of filling in: dd.mm.yyyy		**Title Surname Name**	**Signature**
	Lecturer		
	Teachers in charge of application	Lect.dr. M Tripon Ph.D	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	Universitatea Tehnică din Cluj-Napoca
1.2 Facultatea	ConstrucţiiFaculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Ingineria Fabricaţiei
1.4 Domeniul de studii	Inginerie Industrială
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii/ Calificarea	Tehnologia Construcţiilor de Maşini (în limba engleza)/Inginer
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	202.00

2. Date despre disciplină

2.1 Denumirea disciplinei			**Pedagogie II (Teoria și metodologia instruirii. Teoria și metodologia evaluării)**				
2.2 Titularul activităţilor de curs			**Conf. univ. dr. Liana Tăușan** liana.tausan@dppd.utcluj.ro				
2.3 Titularul activităţilor de seminar			**Asociat, Coroian Mihaela**				
2.4 Anul de studiu	**II**	2.5 Semestrul	**3**	2.6. Tipul de evaluare	**E**	2.7 Regimul disciplinei	**DC Dfac**

3. Timpul total estimat (ore pe semestru al activităţilor didactice)

3.1 Număr de ore pe săptămână	4	din care 3.2 curs	2	din care 3.3 seminar/laborator	2
3.4 Total ore din Planul de învăţământ	56	din care 3.5 curs	28	din care 3.6 seminar/laborator	28
Distribuţia fondului de timp					ore
Studiul după manual, suport de curs, bibliografie şi notiţe					20
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren					20
Pregătire seminarii/laboratoare, teme, referate, portofolii şi eseuri					25
Tutoriat					
Examinări					4
Alte activităţi....					

3.7. Total ore studiu individual	**69**
3.8. Total ore din planul de învăţământ	**56**
3.9 Total ore pe semestru	**125**
3.10 Numărul de credite	**5**

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	• Psihologia educației • Pedagogie I
4.2 de competenţe	• Competenţe formate ca urmare a studierii disciplinelor Psihologia educației, Pedagogie I

5. Condiţii (acolo unde este cazul)

5.1 de desfăşurare a cursului	• Participare activă • Sală de curs dotată cu videoproiector, tablă, flip-chart
5.2 de desfăşurare a seminarului/laboratorului	• Lectura bibbliografiei recomandate • Documentare suplimentară • Elaborarea şi susţinerea prezentărilor planificate

	• Participare activă

6. Competenţe specifice acumulate

Competenţe profesionale	C1: Proiectarea unor programe de instruire sau educaţionale adaptate pentru diverse niveluri de vârstă/pregătire şi diverse grupuri ţintă; C2: Realizarea activităţilor specifice procesului instructiv-educativ din învăţământul gimnazial; C3: Evaluarea proceselor de învăţare, a rezultatelor şi a progresului înregistrat de elevi; C6:Autoevaluarea şi ameliorarea continuă a practicilor profesionale şi a evoluţiei în carieră; C7:Utilizarea metodelor de cercetare științifică și prelucrare a datelor în domeniul educației; C8:Aplicarea caracteristicilor învățământului centrat pe elev în proiectarea, implementarea și evaluarea curriculum-ului școlar;
Competenţe transversale	CT1 Aplicarea principiilor si a normelor de deontologie profesionala, fundamentate pe optiuni valorice explicite, specifice specialistului în stiintele educatiei CT2 Cooperarea eficienta în echipe de lucru profesionale, interdisciplinare, specifice desfasurarii proiectelor si programelor din domeniul stiintelor educatiei CT3 Utilizarea metodelor si tehnicilor eficiente de învatare pe tot parcursul vietii, în vederea formarii si dezvoltarii profesionale continue CT4: Promovarea valorilor asociate realizării unui învățământ de calitate, în conformitate cu politicile educaţionale interne şi în acord cu cele elaborate şi popularizate la nivel european, pe baza cunoaşterii specificității domeniului educațional european și a interculturalității

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	• dobândirea unor competențe vizând cunoaşterea, interpretarea, prelucrarea şi aplicarea problematicii teoriei şi metodologiei instruirii şi a teoriei şi metodologiei evaluării, a modalităților de organizare a activității școlare pe principiul calităţii şi valorificării eficiente a resurselor;
7.2 Obiectivele specifice	• cunoaşterea semnificaţiei principalelor concepte din cadrul teoriei şi metodologiei instruirii şi a teoriei şi metodologiei evaluării; dezvoltarea capacităților de utilizare a conceptelor; • identificarea corectă a referinţelor empirice ale conceptelor pedagogice şi semnificaţiilor conceptuale ale proceselor de predare-învățare-evaluare; • utilizarea corectă şi în contexte variate a terminologiei specifice teoriei şi metodologiei instruirii și teoriei și metodologiei evaluării; • analizarea modalităților de abordare a procesului de învăţământ; • identificarea unor modalităţi de articulare şi integrare a metodelor şi strategiilor de instruire în procesul de învăţământ; • identificarea unor oportunităţi noi de abordare a metodelor şi procedeelor educaţionale din perspectiva elaborării strategiilor de instruire; • operarea cu conceptele, structurile şi tipologiile implicate în activitatea de evaluare şcolară; • propunerea unor metode şi procedee de evaluare corectă, obiectivă şi semnificativă a performanţelor şcolare ale elevilor; • elaborarea unor proiecte educaţionale, bazate pe strategii didactice coerente, care facilitează stilurile individuale de învăţare şi modurile de organizare a procesului de învăţământ; • elaborarea unor modele de proiectare prin aplicarea normativităţii în activităţile didactice; • dezvoltarea motivaţiei pozitive şi a unei atitudini favorabile faţă de profesia

	didactică, a receptivităţii şi responsabilităţii faţă de schimbările inovatoare din domeniul didacticii generale;

8. Conţinuturi

Curs	Metodologie didactică	Nr. ore
Didactica – teorie generală a procesului de învățământ Paradigme și orientări educaționale actuale Didactica – definire, caracteristici, funcții Obiectul de studiu al didacticii Subramurile didacticii Direcții de dezvoltare a didacticii contemporane	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Procesul de învăţământ - abordare sistemică Definirea conceptelor: sistem de învăţământ, proces de învăţământ Note definitorii ale procesului de învăţământ Abordarea sistemică a procesului de învăţământ	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Procesul de învăţământ – abordare comunicațională Comunicarea – concept, structură Forme ale comunicării Comunicarea didactică Definire şi caracteristici ale comunicării didactice Elemente structurale ale comunicării didactice Surse de distorsiune în comunicarea didactică. Eficientizarea comunicării didactice	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Abordarea interacţională a procesului de învăţământ Predarea – componentă esenţială a procesului de învăţământ (conceptul de predare: semnificaţii tradiţionale şi moderne; forme ale predării; stiluri de predare) Învăţarea (conceptele de învăţare şi învăţare şcolară; stiluri de învățare)	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Sistemul principiilor didactice Principiile didactice: concept, caracteristici Sistemul principiilor didactice Principiul legării teoriei cu practica Principiul accesibilității (al respectării particularităților de vârstă și individuale) Principiul intuiției (al corelației dintre concret și abstract, dintre senzorial și rațional) Principiul sistematizării și continuității în învățare Principiul participării conștiente și active a elevilor Principiul însușirii temeinice	Prelegerea, Conversaţia euristică, Explicația, Problematizarea, Dezbaterea, Suporturi video	2
Metodologia didactică Delimitări conceptuale: tehnologie didactică, metodologie didactică, strategie didactică, metodă de învățământ, procedeu didactic	Prelegerea, Conversaţia euristică, Explicația,	6

Tendinţe actuale privind metodologia didactică Metodele de învăţământ Metode de comunicare şi dobândire a valorilor socioculturale Metode de explorare sistematică a realității obiective Metode fundamentate pe acțiune practică Metode de raționalizare a conținuturilor și operațiilor de predare/învățare	Problematizarea, Dezbaterea, Suporturi video	
Mijloacele de învăţământ Conceptul de mijloace de învăţământ Funcţiile mijloacelor de învăţământ Taxonomia mijloacelor de învăţământ; Cerinţe de selectare şi utilizare a mijloacelor de învăţământ.	Prelegerea, Conversaţia euristică, Explicaţia, Problematizarea, Dezbaterea, Suporturi video	2
Lecţia – formă de bază a organizării procesului de învăţământ Varietatea formelor de organizare a procesului de învăţământ: concept, evoluție, clasificare Lecţia – formă fundamentală a organizării procesului de învăţământ Definirea lecției Valențe și critici ale lecției Variabile și cerințe pedagogice ale lecției Tipuri fundamentale de lecţii	Prelegerea, Conversaţia euristică, Explicaţia, Problematizarea, Dezbaterea, Suporturi video	2
Evaluarea în procesul de învăţământ Definirea şi analiza conceptelor: evaluare, măsurare, apreciere. Funcţiile evaluării Forme de evaluare a rezultatelor şi progreselor şcolare: evaluarea iniţială, evaluarea finală (sumativă), evaluarea formativă (continuă), evaluarea formatoare Metode şi tehnici de evaluare a rezultatelor şi progreselor şcolare Erori în evaluarea şcolară. Modalităţi de corectare.	Prelegerea, Conversaţia euristică, Explicaţia, Problematizarea, Dezbaterea, Suporturi video	4
Proiectarea didactică Proiectarea didactică: concept, caracteristici. Modelul tradițional/modelul curricular al proiectării Etapele proiectării pedagogice Condițiile unei proiectări pedagogice eficiente Demersurile proiectării didactice la nivel micro Lectura personalizată a programei şi a manualelor şcolare Planificarea calendaristică Proiectarea secvențială a unităților de învățare Proiectarea lecţiilor/ activităţilor didactice	Prelegerea, Conversaţia euristică, Explicaţia, Problematizarea, Dezbaterea, Suporturi video	4

8.2 Seminar/laborator	**Metode de predare**	**Nr. ore**
Didactica tradițională /didactica modernă. Centrarea pe elev – obiectiv al didacticii moderne.	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Abordarea sistemică a procesului de învățământ: componentele procesului de învățământ și relațiile dintre ele.	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Comunicarea didactică: elemente structurale, retroacțiuni, surse de distorsiuni, modalități de eficientizare a comunicării didactice.	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Interacțiunea proceselor de predare-învățare-evaluare. Condițiile predării eficiente. Condițiile învățării.	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Moduri concrete de aplicare a principiilor didactice pe diverse situații de instruire.	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Metode de comunicare, metode de explorare a realității, metode bazate pe acțiune practică, metode de raționalizare a conținuturilor – caracteristici, avantaje, limite, exemplificări	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	4
Metode interactive, metode de dezvoltare a gândirii critice – caracteristici, exemplificări	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	4
Cerinţe pedagogice impuse de desfăşurarea unei lecţii eficiente. Modalităţi de modernizare a lecţiei.	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Testul docimologic – cerințe, exemplificări	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică, explicația	2
Modalități practice de atenuare a erorilor în evaluare.	Prezentări, dezbateri, studii de caz	2
Condiții ale unei proiectări didactice eficiente. Exerciții de proiectare didactică: planificare calendaristică, proiectarea unității de învățare, proiectarea lecției.	Prezentări, dezbateri, studii de caz, brainstorming, joc de rol, conversația euristică,	2

	explicația	
Evaluare portofoliu seminar	Evaluare prin portofoliu	2

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9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

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10. Evaluare

Tip de activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs	Volumul şi corectitudinea cunoştinţelor Rigoarea ştiinţifică a limbajului Organizarea conţinutului Originalitatea Capacitatea de evidențiere a aplicabilității temei teoretice	Probă de evaluare scrisă, durata evaluării: 2 ore	60%
10.5 Seminar/laborator	Elaborarea și prezentarea materialelor/elementelor componente ale portofoliului Participare activă la seminarii (dezbateri, analiza și sinteza unor materiale/conținuturi, transpunerea în practică a conținuturilor teoretice, analize critice) Oroginalitatea și potențialul creativ manifestate de studenți în cadrul activităților de seminar și în întocmirea portofoliului	Portofoliu	20%
		Observarea curentă a participării active a studenților la seminar	20%
10.6 Standard minim de performanţă			
• 50% rezultat după însumarea punctajelor ponderate conform pct.10.3.			

Data completării:	**Titulari**	**Titlu Prenume NUME**	**Semnătura**
	Curs	Conf. univ. dr. Liana TĂUȘAN	
	Seminar	Asociat, Mihaela Coroian	

Data avizării în Consiliul Departamentului,	Director Departament, Prof. dr. ing. Carmen BAL

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	Universitatea Tehnică din Cluj-Napoca
1.2 Facultatea	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Ingineria Fabricaţiei
1.4 Domeniul de studii	Inginerie Industrială
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii / Calificarea	Tehnologia Construcţiilor de Maşini (în limba engleza)/Inginer
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	202.00

2. Date despre disciplină

2.1 Denumirea disciplinei	Pedagogie II (Teoria si metodologia instruirii, Teoria si metodologia evaluarii)						
2.2 Aria de conţinut	Pedagogie						
2.3 Responsabil de curs	Conf. univ. dr. Liana Tausan email: lianatausan@yahoo.com						
2.4 Titularul activităţilor de seminar / laborator / proiect	Cadru didactic asociat Mihaela Coroian email mihaelatoacsen@yahoo.com						
2.5 Anul de studiu	2	2.6 Semestrul I	I	2.7 Tipul de evaluare	nota.	2.8 Regimul disciplinei	DC/DFac

3. Timpul total estimat

3.1 Număr de ore pe săptămână	4	din care: 3.2 curs	2	3.3 seminar / laborator	2
3.4 Total ore din planul de învăţământ	56	din care: 3.5 curs	28	3.6 seminar / laborator	28

Distribuţia fondului de timp	ore
Studiul după manual, suport de curs, bibliografie şi notiţe	30
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren	20
Pregătire seminarii / laboratoare, teme, referate, portofolii şi eseuri	19
Tutoriat	
Examinări pe parcurs	
Alte activităţi..................................	

3.7 Total ore studiu individual	69
3.8 Total ore pe semestru	125
3.9 Numărul de credite	5

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	
4.2 de competenţe	

5. Condiţii (acolo unde este cazul)

5.1. de desfăşurare a cursului	-
5.2. de desfăşurare a seminarului / laboratorului / proiectului	Sala cu videoproiector, PC, laptop, film didactic, ghiduri de evaluare, manuale, fise, lucrari de specialitate, modele de proiecte didactice.

6. Competenţele specifice acumulate

Competenţe profesionale	• caracterizarea statutului epistemologic al Teoriei curriculum-ului (TC); determinarea poziţiei TC în sistemul ştiinţelor educaţiei; • • definirea şi caracterizarea principalelor categorii de concepte teoretice şi metodologice specifice domeniului: curriculum, învăţământ centrat pe elev, competenţe, performanţe, relaţii între acestea, arii curriculare.
Competenţe transversale	

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	familiarizarea studenţilor cu principalele concepte, teorii şi modele de interpretare modernă a curriculumului şcolar, înţelegerea de către aceştia a principalelor direcţii de evoluţie în domeniu, interpretarea dintr-o perspectivă teoretică a deciziilor, schimbărilor şi transformărilor promovate în învăţământul românesc în ultimul deceniu şi jumătate.
7.2 Obiectivele specifice	dobândirea de către studenţi a unor abilităţi specifice de integrare şi utilizare în practica şcolară a unor demersuri de proiectare, realizare şi evaluare a curriculum-ului şcolar modern, capabil să asigure optimizarea şi personalizarea procesului de instruire, tratarea diferenţiată a elevilor, iar pe de altă parte integrarea în propriul sistem al valorilor profesionale a unor atitudini de receptivitate şi valorizare faţă de schimbare.

8. Conţinuturi

8.1 Curs	Metode de predare	Observaţii

Bibliografie		
8.2 Seminar / laborator / proiect	Metode de predare	Observaţii
Organizarea activităţii de seminar - Prezentarea specificului disciplinei - Analiza tematicii şi a bibliografiei aferente - Prezentarea modalităţilor de lucru şi discutarea criteriilor de evaluare a activităţii de seminar	explicatia, conversatia euristică , demonstratia, exercitiul problematizarea, studiul de caz, jocul de rol, observatia, argumentarea, tehnici de cultivare a creativităţii.	
Conţinuturile procesului de învăţământ - componentă a curriculumului - Selecţia conţinuturilor • Organizarea conţinuturilor : transpunerea didactică;obiectivarea conţinuturilor în documente curriculare: plan de învăţământ, programe şcolare, manuale şcolare, auxiliare curriculare.		
Seminar - sinteză • Exerciţii de pregătire a examenului • Concluzii, analize, dezbateri • Evaluarea activităţii de seminar		

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9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs			
10.5 Seminar/Laborator	-Implicare în cadrul activităților de seminar -Prezentarea unei teme din programa disciplinei -Elaborarea corectă a pieselor de portofoliu. -Analiza/ interpretarea/ crearea unor produse curriculare specifice domeniului de studiu; -Utilizarea unor modalităţi plurale de abordare a educaţiei în scopul orientării spre competitivitate şi performanţă. -Abordarea transdisciplinară a problematicii educaţionale; -Manifestarea unor atitudini şi motivaţii pozitive, responsabile faţă de propria pregătire pedagogică. -Autoevaluarea evoluţiei personale pe parcursul situaţiilor de instruire	-Portofoliu didactic -Participarea și implicarea studenților	40%
10.6 Standard minim de performanţă			
• Standarde minime pentru nota 5: - participare redusă la curs şi seminar - cunoştinţe minimale ale domeniului studiat; - obţinerea punctajului minim la activităţi de seminar şi a punctajului minim la testul docimologic. • Standarde minime pentru nota 10: - implicare şi participare activă la activităţile de curs şi seminar - cunoştinţe temeinice şi capacitate de realizare a transferurilor - utilizarea adecvată a terminologiei specifice pe parcursul analizei situatiilor educationale concrete; - obţinerea punctajului maxim atât la activităţile de seminar cât şi la testul docimologic			

Data completării:	**Titulari**	**Titlu Prenume NUME**	**Semnătura**
	Curs	Conf. univ. dr. Liana Tausan	
	Aplicații	Dr.Mihaela Coroian	

Data avizării în Consiliul Departamentului IF __________________________	Director Departament IF Sl.dr.ing. Adrian TRIF
Data aprobării în Consiliul Facultății CM __________________________	Decan Prof.dr.ing. Corina BÎRLEANU

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	Universitatea Tehnică din Cluj-Napoca
1.2 Facultatea	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Ingineria Fabricaţiei
1.4 Domeniul de studii	Inginerie Industrială
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii / Calificarea	Tehnologia Construcţiilor de Maşini (în limba engleza)/Inginer
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	203.00

2. Date despre disciplină

2.1 Denumirea disciplinei	**Didactica specialităţii tehnice**						
2.2 Aria de conţinut							
2.3 Responsabil de curs	Prof. Dr. ing. Carmen BAL – carmen.bal@dppd.utcluj.ro						
2.4 Titularul activităţilor de seminar /	Prof. Dr. ing. Carmen BAL – carmen.bal@dppd.utcluj.ro						
2.5 Anul de studiu	3	2.6 Semestrul	5	2.7 Tipul de evaluare	E	2.8 Regimul disciplinei	DC/DFac

3. Timpul total estimat (ore pe semestru al activităţilor didactice)

3.1 Număr de ore pe săptămână	4	din care: 3.2 curs	2	3.3 seminar / laborator	2
3.4 Total ore din planul de învăţământ	56	din care: 3.5 curs	28	3.6 seminar / laborator	28

Distribuţia fondului de timp	ore
Studiul după manual, suport de curs, bibliografie şi notiţe	18
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren	20
Pregătire seminarii / laboratoare, teme, referate, portofolii şi eseuri	25
Tutoriat	
Examinări	3
Alte activităţi..................................	3

3.7 Total ore studiu individual	69
3.8 Total ore pe semestru	125
3.9 Numărul de credite	5

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	• didactica disciplinelor tehnice
4.2 de competenţe	idem

5. Condiţii (acolo unde este cazul)

5.1. de desfăşurare a cursului	• Sala de curs

5.2. de desfăşurare a seminarului / laboratorului / proiectului	• Prezenţa la laborator este obligatorie

6. Competenţele specifice acumulate

Competenţe profesionale	C1. Operarea cu metodelor şi procedeelor utilizate în predarea disciplinelor tehnice, a instrumentelor de predare-învăţare şi a instrumentelor de evaluare pentru aceste discipline din planul de învăţământ. C1.1. Cunoaşterea noţiunilor de didactică şi a celor de curriculum . C1.2. Folosirea corectă a metodelor de învăţământ în cadrul lecţiilor de specialitate tehnică. C1.3. Utilizarea corectă a obiectivelor şi strategiilor didactice în cadrul lecţiilor de specialitate tehnică. C1.4. Însuşirea de către studenţi a obiectivelor generale ale învăţării disciplinelor de specialitate tehnică în şcoală. C1.5. Utilizarea corectă a metodelor şi instrumentelor de evaluare în cadrul lecţiilor de specialitate tehnică. C2. Prezentarea unor modele de proiecte didactice.
Competenţe transversale	• CT3 - Autoevaluarea obiectivă şi diagnoza nevoii de formare profesională continuă în scopul inserţiei pe piaţa muncii şi al adaptării la dinamica cerinţelor acesteia şi pentru dezvoltarea personală şi profesională. Autocontrolul învăţării şi utilizarea eficientă a cunoştinţelor de didactica specialităţii tehnice, dezvoltă o buna gestionare a activităţilor personale, precum şi cea de comunicare.

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	• Însuşirea de către studenţi a conceptelor de bază de proiectare didactică a metodelor şi strategiilor de predare învăţare - evaluare, a tehnicilor de formare a echipelor de lucru, planificare a timpului şi întocmirea documentaţiei didactice necesare în procesul de predare – învăţare – evaluare.
7.2 Obiectivele specifice	• Formarea competenţelor de organizare, proiectare şi evaluare a activităţilor didactice la disciplinele tehnice. • Utilizarea adecvată a conceptelor reformei curiculare. • Formarea competenţelor de proiectare curriculară în domeniul disciplinelor tehnice. • Înţelegerea necesităţii operaţionalizării obiectivelor educaţionale • Cunoaşterea metodelor de învăţământ utilizate la predarea disciplinelor tehnice. • Cunoaşterea formelor de organizare a activităţii elevilor la disciplinele tehnice. • Formarea competenţelor de evaluare la disciplinelor tehnice.

8. Conţinuturi

8.1 Curs	Metode de predare	Observaţii

1. Conţinutul învăţământului tehnic. Conceptul de Curriculumul. Componentele Curriculum-ului Naţional. Clasificare	Expunerea dialogul, problematizarea.	
2. Organizarea activităţii didactice. Conceptul de lecţie. Tipuri de lecţii.	Exemplificare, dialog , comunicarea euristică	
3. Strategii didactice a profesorului de specialitate. Integrarea mijloacelor de învăţământ în procesul de predare - învăţare - evaluare a disciplinelor de specialitate.		
4. Metode specifice de predare –învăţarea a disciplinelor de specialitate tehnică. Criterii de alegere a metodelor de învăţământ;	Comunicare euristică, problematizarea, dialogul	
5. Proiectarea demersului didactic pentru filiera tehnologică, profil tehnic. Planificarea calendaristică;	Comunicare euristică, problematizarea, dialogul,	
6. Proiectarea unităţii de învăţare; Proiectarea activităţii didactice	Comunicare euristică, problematizare, studiu de caz,	
7. Exigente in stabilirea si formularea obiectivelor educaţionale. Niveluri de definire a obiectivelor educaţionale**;** Obiective cadru, obiective de referinţa, obiective operaţionale	Studiu de caz, realizarea unui mini proiect de lecţie.	
8. Competente generale, competente; specifice. Transpunerea competenţelor în obiective operaţionale; Metodologia operaţionalizării obiectivelor		
9. Mijloace de învăţământ	Conversaţia euristică, problematizarea**.**	
10. Alegerea mijloacelor de învăţământ în funcţie de tipul de lecţie		
11. .Evaluarea şi funcţiile ei;		
12. Metode de evaluare. Clasificarea acestora	Problematizarea, lucrul în grupe, studiu de caz.	
13. Instrumente de evaluare folosite în cadrul lecţiilor .		
14. Itemi şi clasificarea itemilor de evaluare.		

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2. Carmen Bal, Noţiuni de didactica specialităţii tehnice, Editura UTPRES Cluj Napoca, 2007;
3. Jurcău Nicolae**,** Carmen Bal (coordonator şi coautor), Metodica disciplinelor tehnice, Editura UTPRES;
4. Jurcău Nicolae**,** Carmen Bal (coordonator şi coautor), Didactica disciplinelor tehnice, Editura UTPRES, Cluj Napoca, 2006;
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6. Jurcău, N., - Metodica predării disciplinelor tehnice, Atelierul de multiplicare al Institutului Politehnic, Cluj, 1984
7. Ionescu, M. – Lecţia între proiect şi realizare, Ed. Dacia, Cluj 1982

8.2 Seminar / laborator / proiect	**Metode de predare**	**Observaţii**
1. Finalităţile şi obiectivele studierii disciplinelor tehnice - exemple de programe şcolare din cadrul curriculum-ului Tehnologii.	Lucrul pe grupe de 4, cu materiale didactice, pla invatamant, programa şcolară.	
2. Conţinutul lecţiei - exemple de lucru.	Lucrul pe echipe de recunoaştere şi fixare de obiective şi competenţe în funcţie de diferite conţinuturi şi tipuri de lecţii.	
3. Realizarea unui planificări calendaristice orientative – aplicaţie.Obiectivele lecţiei şi modul de fixare a acestora în cadrul unei lecţii.		
4. Studiu privind metodele de predare-învăţare eficiente pentru atingerea obiectivelor	Întocmirea de documente didactice şi realizarea de proiecte de lecţie.	
5. Eficientizarea metodelor de învăţământ - studiu de caz		
6. Proiectarea didactică. Realizarea unui planificări calendaristice orientative.	Realizarea diferitelor proiecte de lecţie	

7. Obiectivele lecţiei şi modul de fixare a acestora în cadrul unei lecţii.	Întocmirea unui portofoliu didactic.	

Bibliografie
1. Ciot, Gabriela - Elemente de pedagogie şi teoria şi metodologia curriculumului, Ed. Universităţii din Oradea , 2003.
2. Carmen Bal, Noţiuni de didactica specialităţii tehnice, Editura UTPRES Cluj Napoca, 2007;
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4. . Jurcău Nicolae, Carmen Bal (coordonator şi coautor), Didactica disciplinelor tehnice, Editura UTPRES, Cluj Napoca, 2006;
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8. Consiliul Naţional pentru Curriculum - Ghid metodologic pentru aplicarea programelor şcolare, TEHNOLOGII, Liceu tehnologic-profil tehnic, Editat de Aramis Print, 2002.
9. Curriculum Naţional. Programe şcolare pentru clasa a IX-a. Volumele 1-3, M.E.N., C.N.C. Editura Cicero, Bucureşti, 1999

9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

• Disciplina este una fundamentală în cadrul modulului de psihopedagogie şi transmite studenţilor noţiuni menite să le dezvolte abilităţile de proiectare didactică, utilizarea eficientă a metodelor şi strategiilor de predare - învăţare – evaluare.

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs			
10.5 Seminar/Laborator	• activitate la seminar – 20%; • portofoliu (elaborare proiecte didactice şi teste de evaluare) – 40%; • examinare finală – 40%.		50% din punctajul evaluarii finale + 50% din punctajul evaluarii finale.
10.6 Standard minim de performanţă			
• predarea proiectului de lectie; • predarea unui set de probe de evaluare; obţinerea a 50 % din punctajul verificării finale.			

Data completării:	Titulari	Titlu Prenume NUME	Semnătura
	Curs	Prof. Dr. ing. Carmen BAL	
	Aplicații	Prof. Dr. ing. Carmen BAL	

Data avizării în Consiliul Departamentului IF _________________________	Director Departament IF Sl.dr.ing. Adrian TRIF
Data aprobării în Consiliul Facultății CM _________________________	Decan Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	40

2. Data about the subject

2.1	Subject name			**Machine Elements II**			
2.2	Subject area			Machine Elements			
2.3	Course responsible/lecturer			Prof.PhD.Eng. Barleanu Corina; Corina.Barleanu@omt.utcluj.ro			
2.4	Teachers in charge of seminars			Asist. PhD.Eng. Horea Crisan, Horea.Crisan@omt.utcluj.ro			
2.5 Year of study	III	2.6 Semester	5	2.7 Assessment	E	2.8 Subject category	DID/DOB

3. Estimated total time

3.1 Number of hours per week	5	3.2 of which, course:	2	3.3 applications:	3
3.4 Total hours in the curriculum	130	3.5 of which, course:	28	3.6 applications:	42

Individual study	hours
Manual, lecture material and notes, bibliography	26
Supplementary study in the library, online and in the field	0
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	30
Tutoring	0
Exams and tests	4
Other activities	0

3.7	Total hours of individual study	60
3.8	Total hours per semester	130
3.9	Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	Passing the courses: Descriptive Geometry and Mechanical Drawing, Material Science, Computer Programming, Mechanics and Machine Element I, Strength of Materials, Tolerances and Dimensional Control
4.2	Competence	Specific professional development of industrial engineering projects based selection, combination and use of knowledge, principles and methods from the field of basic sciences of industrial

		engineering domain and their association with drawing –technical graphics.

5. Requirements (where appropriate)

5.1	For the course	Projector multi-media, blackboard
5.2	For the applications	Equipment from the laboratory “Machine Elements and Tribology”

6. Specific competences

Professional competences	**C2.1.** Defining the principles and the methods of basic science industrial engineering field associated with graphics – technical drawing. **C2.2.** Using the knowledge from the basic engineering sciences to explain and interpret the theoretical and experimental results, the drawings and the specific industrial engineering phenomena and processes **C2.3.** Applying the principles and methods from basic science of industrial engineering domain and associated with graphics - technical drawing, for strength calculations, sizing, establishing the technical conditions, establishing correspondence between features and functional role prescribed, and so on, in specific applications of industrial engineering under qualified help. **C2.4.** Appropriate use of the standard assessment criteria and methods from basic engineering sciences, for identification, modeling, experimentation, analysis and assessment of the qualitative and quantitative aspects, phenomena and definitive parameters as well as gathering data, processing and interpretation of the results from specific industrial engineering trials. **C2.5.** Elaboration of professional projects specific to industrial engineering on the basis of combining and usage of knowledge, principles and methods from the field of basic sciences of industrial engineering domain and their association with graphics –technical graphics **C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to the mechanical area.. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the mechanical area.. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the mechanical area. **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to mechanical area. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the mechanical area.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Mechanical design principles. Design, manufacture & assembly of basic machine elements.

7.2	Specific objectives	To know the machine components (mechanisms and general machine elements, respectively) from the construction, calculus end design point of view. To know the fundamental design principles used in machine building field. To understand the functional role of the machine elements, the movement and load transmitting modality, and their calculus principles, respectively. To evaluate correctly the loading of the machine elements and the influence factors

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Bevel gears with straight teeth: Kinematical and geometrical particularities. Equivalent gears. Strength calculation of bevel gears. Dimensioning of bevel gear based on contact.	Oral presentation, notes on blackboard and multimedia presentation, Completing the course with helpful lecture notes	Students are encouraged to ask questions, interactive course
2.	Dimensioning of bevel gear based on bending stress. Worm gears: geometry. Sliding speed. Equivalent gears. Forces in worm gear.		
3.	Strength calculation of worm gears, contact pressure and bending stress		
4.	Thermal calculation of worm gear. Dimensioning of worm gear based on contact stress, bending and thermal stress.		
5.	Rolling bearings: Basics, classification, advantages-disadvantages, materials. Kinematics relations in the rolling contact bearings. Friction in rolling contact bearings. The causes of the rolling bearing replacement. Symbolization.		
6.	Lubrication and sealing. Mounting and dismounting of bearings.		
7.	Rolling bearings design: operating conditions, design principles. The determination of the rolling contact bearing dimensions: The base load and the rolling bearings durability. The equivalent dynamic bearing load.		
8.	Functions of bearings. First class functions: Typical assemblies with bearings Examples.		
9.	Transmissions with belts. General terms. Design aspects. Calculus.		
10.	Transmissions with chains. General terms. Design aspects. Calculus.		
11.	Elastic couplings. Overview. Terminology. Classification. Fixed permanent couplings. Flanges Coupling. Claw couplings.		
12.	Permanent mobile couplings. Couplings with rigid elements for angular deviations, Coupling with elastic element (with bolts, Periflex).		
13.	Intermittent coupling (clutches). The coupling valve.		
14.	Elements of tribology. Applications: Model of Open book exam method.		

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1. Chişiu, Al. ş.a. (1981) - Organe de maşini. Bucureşti, E.D.P., 1981

2. Antal A, Birleanu C. (2000) - Mecanisme şi Organe de Maşini. Editura Todesco, Cluj-Napoca, 2000, ISBN 973 – 99659 – 6 – 2,

3. Sucală, F., Bîrleanu, C., Tătaru, O. (2000) - Mechanical Systems Engineering. Ingineria Sistemelor Mecanice. Vol. I, Cluj-Napoca, Editura RISOPRINT, ISBN 973-656-181-X, 2002

4. Sucala F., Antal A., Belcin O., Birleanu C., Bojan S. s.a. (2008) – Organe de Masini, Mecanisme si Tribologie, Studii de caz, ed. Todesco Cluj-Napoca, 2008, ISBN- 978-973-7695-65-9,

5. Sucală F., Bojan Şt. (2005) - Mecanisme şi organe de maşini. Vol. I, Cluj-Napoca, Editura RISOPRINT, 2005, ISBN 973-656-866-0

6. Belcin O., Birleanu C., Pustan M. (2011) – Organe de Masini, Elemente constructive in proiectare, Cluj-Napoca, 2011, Ed. Risoprint Cluj-Napoca, ISBN 978-973-53-0684-7

7. Hamrock Bernard, s.a (2005) – Fundamentals of Machine Elements, McGraw – Hill Education,

8. Mott Robert (2004) – Machine Elements in Mechanical Design, Pearson, Prentice Hall

9. Shigley E., Mischke C. (1989) – Mechanical Engineering Design, McGraw – Hill Education

10. Pustan, M., Belcin, O., Birleanu, C. (2013) – ORGANE DE MAȘINI - Asamblări demontabile, Osii și arbori drepți, Arcuri metalice, Ed. UTPRESS, Cluj-Napoca, ISBN 978-973-662-821-4.

11. Spotts M.F., Shoup T.E., Hornberger L.E (2003) – Design of Machine Elements, Pearson, New Jersey

12. Uicker J., Gordon R., Shigley J. (2011) – Theory of Machines and Mechanisms, Oxford University Press, 2011

13. Handra Luca V., Stoica A. (1982) – Intoducere in teoria mecanismelor, Ed. Dacia, Cluj-Napoca, 1982

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15. Belcin, O., Pustan, M., Turcu, I., (2005) Organe de maşini. Osii şi arbori drepţi – Probleme rezolvate, Ed. Risoprint, Cluj-Napoca, ISBN 973-656-971-3

16. Belcin, O., Pustan, M. (2008) Organe de maşini. Rulmenţi. Angrenaje –Probleme rezolvate. Ed. Risoprint, Cluj-Napoca, ISBN 978-973-751-871-2

8.2. Applications/Seminars	Teaching methods	Notes
1. Presentation Laboratory of Machine Elements, the requirements of laboratory work. Work safety measures.	Practical work in the laboratory, Interpretation of experimental results, Calculation examples	Students are asked and encouraged to ask questions, interactive activity
2. Reestablishing the dimensional parameters of external bevel gear trains. Applications - the calculation of forces in bevel gears.		
3. Reestablishing the dimensional parameters of worm gear. Applications - the calculation of forces in worm gear.		
4. Friction losses in bearings. Applications - Bearing selection and calculus.		
5. Testing of friction disc clutches.		
6. Study of influence factors on the operation of belt transmissions.		
7. Static characteristics of elastic couplings. Applications - choice and verification of couplings.		

8.1. Project theme: Design a mechanical transmission for driving a robot arm, comprising a helical gear / bevel gear or worm gear and a V-belt transmission for the following dates: 1. The power of drive electric motor: P_m = __________[KW] 2. The speed of drive electric motor: n_m = ___________[rot/min]. 3. Total transmission ratio of the whole mechanical transmissions: i_{tot} =	
The theme of the project. Transmission gear. (contains a step gears, V-belt transmission). Documentation. Presentation of two variants on the theme. Justification of the chosen solution. The distribution of the gear ratios on the stages reduction. The calculation of speeds, powers and torques on the shafts. The choice of materials for shafts. Predimensioning of shaft ends. Selection of materials for gears. Predimensioning gear. Preliminary assembly drawing. Strenght calculation of the gear. Calculation of geometric elements and precision elements of gear. Calculation of forces in gear. The design configuration of shaft. Completion assembly drawing. Calculation of belt drives. Sizing the pulleys. Completion assembly drawing. Calculation of reaction forces on the shafts. Completion assembly drawing. The calculations to verify the gear input shaft. Completion assembly drawing. The verification calculus of the bearings. Completion assembly drawing. The calculation of the other constructive elements of the transmission. Heating verification of the gear. Completion assembly drawing. Complete assembly drawing. Complete execution drawings for the input shaft in gear and driven gear wheel. Delivery project. Written support of the project (written test).	Oral presentation, notes on blackboard and multimedia presentation, for each calculation or design step Completing the project classes with helpful lecture notes Students are encouraged to ask questions, Interactive classes, an also have to prepare each stage (homework) that will be checked weekly.

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1. Antal A, ş.a. Reductoare. Atelierul de multiplicare al UTC-N, Cluj-Napoca 1994.
2. Antal A, Tătaru, O. Elemente privind proiectarea angrenajelor, Editura TODESCO, 2000
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6. Corina Birleanu (2004) Organe de masini, vol. II, Editura Risoprint, Cluj-Napoca, 2004,

7. O. Belcin, C. Birleanu, M. Pustan (2011) Organe de Masini, Elemente constructive in proiectare, Cluj-Napoca, 2011, Ed. Risoprint
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15. Uicker J., Gordon R., Shigley J. (2011) – Theory of Machines and Mechanisms, Oxford University Press, 2011
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18. Belcin, O., Pustan, M., Turcu, I., (2005) Organe de maşini. Osii şi arbori drepţi – Probleme rezolvate, Ed. Risoprint, Cluj-Napoca, ISBN 973-656-971-3.
19. Belcin, O., Pustan, M. (2008) Organe de maşini. Rulmenţi. Angrenaje –Probleme rezolvate. Ed. Risoprint, Cluj-Napoca, ISBN 978-973-751-871-2

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The tools and sciences, skills are acquired in this course, constitute the foundation for the practice of engineering. And so, at this stage of undergraduate education, it is appropriate to introduce some professional aspects of engineering. These professional studies should integrate and use the tools and the sciences in the accomplishment of an engineering objective.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	The ability to answer to theoretical questions and to solve practical problems. All the subjects from the exam are mandatory.	The exam consists in solving some applications in "open book" method	Exam (mark E); 80% E
Applications	The presence at laboratory is compulsory (100%). The activity during project and lab classes is appreciated	Lab will be completed with providing a portfolio of works and ends with a mark. The project work will be accompanied by a final written test and it's have separated mark.	Lab mark (mark L); 5% L Project mark (mark P); 15% P
10.4 Minimum standard of performance			
Final grade: N = 0.8E + 0.05L + 0.15P			

The final credit can be received only if each of the mark's components is fulfilled: Passing the exam if: N≥5; E≥5; P≥5; L≥5.

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Prof.PhD.Eng. Birleanu Corina	
	Teachers in charge of application	Asist.PhD.Eng. Crisan Horea	

Date of approval in the department IF

____

Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	41.00

2. Data about the subject

2.1	Subject name			Fundamentals of Cutting and Surface Generation			
2.2	Subject area			Manufacturing Eng.			
2.3	Course responsible/lecturer			Prof.dr.ing Danut Julean email: danut.julean@staff.utcluj.ro			
2.4	Teachers in charge of seminars			Prof.dr.ing. Danut Julean email: danut.julean@staff.utcluj.ro			
2.5 Year of study	3	2.6 Semester	1	2.7 Assessment	E	2.8 Subject category	DID/DOB

3. Estimated total time

3.1 Number of hours per week	5	3.2 of which, course:	3	3.3 applications:	2
3.4 Total hours in the curriculum	130	3.5 of which, course:	42	3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					40
Supplementary study in the library, online and in the field					8
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					10
Tutoring					
Exams and tests					2
Other activities					

3.7	Total hours of individual study	60
3.8	Total hours per semester	130
3.9	Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	Credits obtained for following disciplines: materials engineering, Materials Technology, Mechanics, Strength of Materials, descriptive Geometry and technical Drawing
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Microsoft Excel medium user

6. Specific competences

Professional competences	C 1.2. Using basic knowledge in the fundamental disciplines for theoretical explanation and interpretation of results, theorems, phenomena or specific processes of industrial engineering. C 4.1. Describing the theory, methods and basic principles for designing the processes specific to machine building technology. C 4.2. Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. C 5.1. Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology.
Cross competences	CT 1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	• to present the principles of surface generation by metal cutting; • to present the importance of main factors influencing the cutting process and how they can be controlled; • to present the conditions for achieving an efficient cutting process.
7.2	Specific objectives	• to present the calculus for main cutting process parameters (forces, power, work removing rate, roughness); • to present selecting the optimal cutting tool geometry and establishing of optimal cutting regime, (t, s, v, T); • to choose the adequate generation procedure for a specific workpiece surface

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Introduction; Presentation of the content of the course; History; The importance and the role of cutting processes in modern processing technologies	The lectures are presented with media projector. The presentations and auxiliary materials could be downloaded from teacher's site. Video presentations are used as auxiliary means.	
Generating surfaces: Surfaces, geometric surfaces. Real surfaces. Generating curves. Methods for generating curves. The formation movements. Surfaces generation on the m-tools. Machine tool movements: execution movements. Parameters of movements in space and in time.		
Kinematic structure of machine-tools: composition of the kinematic chains. Classification of kinematic chains. Mechanisms of movements. Synthesis of kinematic chains of machine tools. Kinematic chain for Threading. Kinematic chain for tapered Threading. Kinematic chain of radial relieving.		
Physical basics of chip formation process: Mechanics of orthogonal cutting. The shear plane model.		
Oblique cutting		
Discontinuous chip formation. Thick zone model. Complex cutting		
Tool geometry in "tool in hand system"		
Components of resulting cutting force. Specific cutting force. Factors that influence specific cutting force and resultant force components		
Thermal phenomena in metal cutting: Heat sources. Metal cutting fluids		
Tool materials		
Tool wear: Wear parameters. Wear mechanisms. Tool Life T-v diagrams		
Laws of Metal cutting. Designing the cutting regime parameters. Economic aspects of machining		
Grinding. Grinding wheel construction and exploitation. Chip formation in grinding		
Machinability of metals		
8.2. Applications/Seminars	Teaching methods	Notes

Introduction. Safety rules in laboratory. Presentation of lab activities Kinematic structure of machine tool result of surface generation synthesis Experimental data analysis using Microsoft excel Experimental research of chip formation using orthogonal cutting Study of constructive geometry of cutting tools Experimental study of machined surface roughness Experimental study of cutting forces in turning Experimental study of torque and thrust in drilling Experimental study of thermal phenomena in metal cutting Experimental study of tool wear Experimental study of different chip types formation Designing the cutting regime and choosing the tools using computer software Experimental study of machinability of metals On site visit and evaluation of lab activities	Laboratory activity is centred on experimental study and data processing using the computer and Microsoft Excel. Themes for final diploma project in the field of metal cutting and grinding are also proposed.	

Bibliography: In library

[ARM 69] Armarego, E.J.A, Brown, R.H. The Machining of Metals, Prentice Hall 1969

[***95] ASM handbook. Vol. 16: Machining

[DAV 08] Davim, J.P. ed. Machining: fundamentals and recent advances Springer, 2008

[TRE 93] Trent. E.M. Metal Cutting, Butterworth-Heinemann 1993

[DEA 92] Deacu, L., Kerekes, L., Julean, D., Cărean, M. - Bazele aşchierii şi generării suprafeţelor, Atelierul de multiplicare, IPCN, Cluj – Napoca, 1992.

[JUL 00] Julean, D. - Aşchierea metalelor, Editura Dacia, Cluj – Napoca

[JUL 03] Julean, D. – Aşchiere experimentală, Editura U.T. Pres, Cluj-Napoca 2003

[NED 05] Nedezki, C. - Bazele aşchierii şi generării suprafeţelor - suport de curs , Editura U.T. Pres, Cluj-Napoca, 2005.

[NED 08] Nedezki, C., Julean, D. - Bazele aşchierii şi generării suprafeţelor – Îndrumător de lucrări Editura U.T. Pres, Cluj-Napoca, 2008.

[DEA 81] Deacu, L şi Giurgiuman, H. - BAGS Lito. IPCN, 1981.

[GIU 85] Giurgiuman H. şi colectiv - Bazele aşchierii şi generării suprafeţelor. Îndrumător de lucrări. Atelierul de multiplicare. IPCN. 1985

Virtual teaching materials: http://sites.google.com/site/danutjulean

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Giving right answers to exam topics and afferent explications	The exam is partiality viva voce (1 topic) and written (1 topic +1 problem solving). Duration is one hour and half;	0.6
10.5 Applications	Finalizing all lab reports with diagrams and conclusions. Finalizing the 2 homeworks.	After lecture 7 students may ask for a partial exam (1 hour).	0.2 0.2
10.6 Minimum standard of performance			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof.dr.ing. Danut Julean	
	Teachers in charge of application	Prof.dr.ing. Danut Julean	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	42.00

2. Data about the subject

2.1	Subject name	Machine Tools I
2.2	Subject area	Machine Tools
2.3	Course responsible/lecturer	Prof. PhD eng. Cornel Ciupan, cornel.ciupan@muri.utcluj.ro
2.4	Teachers in charge of seminars	Lecturer PhD.eng. Emanuela Pop, emanuela.pop@muri.utcluj.ro

2.5 Year of study	III	2.6 Semester	I	2.7 Assessment	E	2.8 Subject category	DID/DOB

3. Estimated total time

3.1 Number of hours per week	5	3.2 of which, course:	2	3.3 applications:	3
3.4 Total hours in the curriculum	130	3.5 of which, course:	28	3.6 applications:	42

Individual study	hours
Manual, lecture material and notes, bibliography	20
Supplementary study in the library, online and in the field	22
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	7
Tutoring	3
Exams and tests	4
Other activities	4

3.7	Total hours of individual study	60
3.8	Total hours per semester	130
3.9	Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	Materials, mechanics, mechanisms, strength of materials
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	
5.2	For the applications	Laboratory of machine tools

6. Specific competences

Professional competences	**C3.1.** Describing the basic theories and methods in the field of computer programming and applied informatics specific to machine building technology. **C3.2.** Using the basic knowledge associated to software programs and digital technologies for explaining and interpret the issues of conceive and computer aided design of products, processes and technologies, in experimental and theoretical investigation of computerized data processing, specific to industrial engineering in general, and particularly in machine building technology. **C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students must know and understand the kinematical structure and the architecture of machine tools.
7.2	Specific objectives	The students will be able: • to understand the operation of machine tools • to design the kinematical structure of a manufacturing equipment • to make the kinematical calculations for any manufacturing equipment • to size the main components of machine tools.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Introduction. Definitions. Classification. The performances of the machine tools. Symbols used in kinematic schemes	Lecture participatory debate, exposure	
2. The kinematic structure of machine tools. Operation and adjustment of kinematic axes		
3. Kinematic axis for NC machines. Measuring instruments used in the construction of kinematic axis.		
4. Kinematic axis for NC machines. Cinematic and organological calculations		
5. Gearboxes. Cinematic and organological calculations		

6. Kinematic feed axis. Mechanisms with spare wheels		
7. Organological design. Machine tools beds. Constructive solutions. Dimensioning. Materials used.		
8. Guideways. Constructive solutions. Dimensioning. Materials used.		
9. shafts and spindles. Construction and dimensioning aspects. Used materials.		
10. Drilling machines. Lathes.		
11. Milling machines. Boring and milling machines.		
12. Planers and slotting machines.		
13. Grinding machines		
14. Honing machines and lapping machines		

Bibliography

[BOT 77] Botez, E., ş.a. Maşini unelte şi agregate, Editura Tehnică, Bucureşti 1981
[CIU 2014] Ciupan C. Masini unelete. Notite de curs.
[GAL94] Galis, M., ş.a. Proiectarea maşinilor unelte. Transilvania Press, Cluj-Napoca, 1994
[GHE 83] Gheghea, I., ş.a. Maşini unelte şi agregate, Editura EDP, Bucureşti 1983
[HEL08] Helmi A. Youssef, Hassan El-Hofy. Machining technology: machine tools and operations. CRC Press 2008.
[JOS07] PH Joshi. Machining technology: machine tools and operations. Tata Mc Grow-Hill Publishing Company, New Delhi, 2007

8.2. Applications/Seminars	Teaching methods	Notes
1. Laboratory presentation and work safety training and PSI.	Laboratory	
2. The universal lathe SN 560x1000. Description. Technological possibilities.		
3. The universal lathe SN 560x1000. Thread processing.		
4. Construction, cinematic and exploitation of milling machines. Universal milling machine FUS 22		
5. Universal milling machine FUS 25		
6. Seping S425		
7. Microcut Challenger CNC		

Bibliography

[POP16] Pop E. Ciupan C. Steopan M. Masini unelte. Indrumator de lucrari de laborator. Editura UT PRESS, Cluj-Napoca, 2016

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The course content is consistent with what is done in other universities in the country and abroad and it is appropriate to requirements of labor market.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	correctness and completeness of knowledge; logical consistency;	written paper: 2 hours	30%

	interest to the individual study	active participation	10%
10.5 Applications	ability to work with assimilated knowledge interest to the applications	the writing test active participation	10% 10%
Project	correctness and feasibility of the solutions originality and innovation practical application timely achievement of the project phases	project analysis active participation	30% 10%
10.6 Minimum standard of performance			
knowledge of the fundamentals of theory, solving a simple applications The final credit can be received only if each of the mark's components is fulfilled: 50%			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer	Prof. PhD eng. Cornel Ciupan	
	Teachers in charge of application	Lecturer PhD.eng. Emanuela Pop	

Date of approval in the department IF

____

Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	44.00

2. Data about the subject

2.1	Subject name			Company management			
2.2	Subject area			Management			
2.3	Course responsible/lecturer			Conf.dr.ing. Sorin ȘUTEU – sorin.suteu@mis.utcluj.ro			
2.4	Teachers in charge of seminars			S.L.dr.ing.,ec. Daniela JUCAN – daniela.jucan@mis.utcluj.ro			
2.5 Year of study	3	2.6 Semester	1	2.7 Assessment		2.8 Subject category	DID/DOB

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14
Individual study					hours
Manual, lecture material and notes, bibliography					28
Supplementary study in the library, online and in the field					3
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					14
Tutoring					14
Exams and tests					3
Other activities					0

3.7	Total hours of individual study	62
3.8	Total hours per semester	104
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

6. Specific competences

Professional competences	**C6.1.** Defining the concepts, theories, methods and basic principles for planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment **C6.2.** Using the basic knowledge for explanation and interpretation the issues that arise in planning, management and usage of the manufacturing processes and systems on classic machines and/or CNC as well as in quality assurance and product ascertainment. **C6.3.** Applying of basic principles and methods for planning, management and usage of manufacturing processes and systems, as well as for quality assurance and product ascertainment, under qualified assistance. **C6.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, the advantages and the limits of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment including dedicated software **C6.5.** Elaborating professional projects by using the principles and methods established in the field of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product inspection.
Cross competences	

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To know and understand the requirements of business management in the context of a market economy.
7.2	Specific objectives	To know the characteristics of the managerial work; To know the four functions of management; To gain abilities in planning and decision making; To understand cost structure and to use methods of cost calculation.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Introduction. Business. Resources (material, financial, human, informational). Products (goods and services). Merchandise. Buyer, client, consumer. Profit. Risk. Efficacy vs. efficiency.	• Lectures, using an interactive teaching style; • Us of multimedia tools.	
A broad perspective on management. Ethimology. Definitions. Importance of management. Domains of management. The process of management. Functions of management (planning, organizing, leading, controlling). Functions of enterprise (research and development, operations, finance and accounting, marketing, human resources).		
The manager. Definitions. Classification on hierarchic level (vertically) and on responsibility area (horizontally). Sources of managers. Competences of managers (Robert Katz). Attributions (responsibilities) of managers. The 10 managerial roles (Henry Mintzberg).		
Planning. The planning process. Vision, mission, values. Goals and objectives. Plans (objectives and action programs).Hierarchy of plans (strategical, tactical and operational). Gantt diagram.		
Organizing I. Job. Job description. Department. Criteria for departmentalization. Span of control. Delegation. Policies, rules, procedures.		

Organizing II. Main organizational structures (entrepreneurial, functional, divisional, on strategic business units, matrix). Concepts on organization: birocracy vs. adhocracy.		
Organizing III. Legal forms of business in Romania. Forms without legal personality (Persoană fizică autorizată, Intreprindere individuală, Intreprindere familială). Forms with legal personality (Societăţi comerciale: SNC SCS, SRL, SA, SCA. Regii autonome).		
Organizing IV. Top management of joint stock company: the unitary vs. dualist system. Shares. Bonds. Securities markets.		
Leading I. Performance. Motivation. Theories about motivation: Robert Owen's ideas, Concepts of Frederick Taylor, Hawthorne Studies and Human relation movement, Theories X and Y by Douglas McGregor, Hierarchy of needs, by Abraham Maslow, Theory ERG by Clayton Alderfer, Two factors theory by Henry Mintzberg.		
Leading II. Equity theory by Stacy Adams, Expectancy theory by Victor Vroom, Acquired needs theory by David McClelland).		
Leading III. Managerial stiles: Model of Kurt Lewin, Model of Robert Tannenbaum and Warren Schmidt, Managerial Grid by Robert Blake and Jane Mouton, Model of Cezar Mereuţă.		
Control I. The process of evaluation and control. Types of control. Levels of control. Tools of control.		
Costs I. Expenses vs. costs. Classification in direct and indirect costs. Calculations with direct and indirect costs.		
Costs II. Classification in fixed and variable costs. Calculation of break-even point. The production closing point.		

Bibliography

1. Bartol,K.M., Martin, D.C., *Management*, 2nd Edition, McGraw-Hill, New York, 1994. ISBN 0-07-005078-3.
2. Kiniki, A., Williams, B.K., *Management. A Practical Introduction*, 5th Edition, McGraw-Hill, New-York, 2011. ISBN 978-0-07-811271-3.
3. Lungu, F., Bacali, L., Şuteu, S., *Competenţe în afaceri*. Editura Risoprint, Cluj-Napoca, 2003, 187p. ISBN 973-656-452-5.
4. Nicolescu, O., (coord.), *Studii de caz din managementul românesc și internațional*, Editura Universitară, București, 2009.
5. Simionescu, A., (coord.), *Management general*, Editura Dacia, Cluj-Napoca, 2002. ISBN 973-35-1359-8.

8.2. Applications/Seminars	Teaching methods	Notes
Inflation. Calculation with inflation.	• Case studies: • Tests; • Practical applications.	
Risc and uncertainty. Case study: “EIT Company”.		
Planning exercise: The elaboration of a plan.		
SWOT Analysis. Case study: “Tatrakrystall”		
Human resource evaluation. Case study: MMC Company”.		
Compensation systems. Case study: “Caz de salarii inechitabile”		
Recovery of absents. Ending the students' situation.		

Bibliography

1. Lungu, F., Bacali, L., Şuteu, S., *Competenţe în afaceri*, Editura Risoprint, Cluj-Napoca, 2003, 187p. ISBN 973-656-452-5.
2. Nicolescu, O., (coord.), *Studii de caz din managementul românesc și internațional*, Editura Universitară, București, 2009.
3. Simionescu, A., (coord.), *Management general*, Editura Dacia, Cluj-Napoca, 2002. ISBN 973-35-1359-8.

4. www.insse.ro

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Verification of the learned theoretical knowledge; Evaluation of the ability of solving applicative problems;	Grade for questionnaire (Grade G); Grade for problem solving (Grade P);	1/3 1/3
10.5 Applications	The quality level of the students' homework and the degree of involvement in practical applications.	Grade for applications and homework (Grade LT);	1/3
10.6 Minimum standard of performance			
Final grade: N = (G + P + LT) / 3 Condition to pass the exam: G ≥ 5; LT ≥ 5; N ≥ 5.			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Conf.dr.ing. Sorin ȘUTEU	
	Teachers in charge of application	S.L.dr.ing.,ec. Daniela JUCAN	

Date of approval in the department IF

____

Head of department
Sl.dr.ing. Adrian TRIF

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Coriana BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	45.00

2. Data about the subject

2.1	Subject name			Marketing			
2.2	Subject area			Marketing			
2.3	Course responsible/lecturer			Ucenic Camelia Ioana			
2.4	Teachers in charge of seminars			Bacila Gabriela			
2.5 Year of study	3	2.6 Semester	5	2.7 Assessment	C	2.8 Subject category	DOB

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	102	3.5 of which, course:	28	3.6 applications:	14
Individual study					hours
Manual, lecture material and notes, bibliography					20
Supplementary study in the library, online and in the field					20
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					10
Tutoring					5
Exams and tests					5
Other activities					

3.7	Total hours of individual study	60
3.8	Total hours per semester	102
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	no
4.2	Competence	no

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	N/A

6. **Specific competences**

Professional competences	- Defining concepts, theories, methods and principles regarding marketing activity - Knowing the specific methods for a market research - Evaluating and interpreting the data for marketing activities The students will be able to: - To use the basic knowledge for explaining the problems from activity - To apply methods in order to plan, implement and evaluate marketing activity - To elaborate professional projects in the field
Cross competences	To promote the logical reasoning, convergent and divergent , evaluation and self-evaluation in the process of decision making in marketing

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	Knowing marketing concepts , understanding marketing mix as a whole and by parts, synthesizing significant elements regarding the marketing activity from a company
7.2	Specific objectives	– Price policy – Designing of promotional mesages – Life cycle of products – Organizing marketing department from an organization – The control of marketing activity

8. **Contents**

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Concepts in marketing	Discussions, presentations, case studies	Video projector
2.	Macroenvironment – political, economic, socio cultural environment		
3.	Macroenvironment –tehnological, demograpfical,natural		
4.	Microenvironment		
5.	Market segmentation, pozitioning		
6.	Product policy		
7.	Development of new products		
8.	Price policy		
9.	Promotion		
10.	Distribution		
11.	International Marketing		
12.	Industrial Marketing		
13.	E business		
14.	Control of marketing activity		

Bibliography
1. Bacali L.(2002) – Manual de inginerie economica, Marketing, Editura Dacia, 2. Coordinator Bacali L. [Ucenic C. et all.] (2010) – Marketing, Studii de caz, UTPRES, 3. Kotler Ph. (2000) – Management Marketing, Editia Milenium, 4. Paina N. (2005) – Politici de Marketing, Editura Dacia, Cluj napoca 5. Ucenic C. (2007) - "New Management and Marketing Patterns Concerning the Investigation of Business Environment Evolution, Case Study: A Comparative Analysis Romania - Greece for the Food Sector, Non-metallic Minerals and Basic Metals Sector", Cluj Napoca, Todesco, ISBN 978-973-7695-24-6 *** - Review of Management Marketing

8.2. Applications/Seminars		Teaching methods	Notes
1.	Identifing needs and customers desires	Case studies	
2.	Entering in new markets. Market segmentation		
3.	Development of new products		
4.	Successful promotional campaigns		
5.	Distribution channels		
6.	Pricing		
7.	Industrial marketing		
Bibliography *** - Review of Management Marketing			

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The competences are required for the persons who work in marketing departments as well as for the ones from departments which collaborate with marketing

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Written exam/ oral exam	evaluation	80%
Applications	Solving a case study		20%
10.4 Minimum standard of performance			
Each subject must be treated for minimum the grade 5 out of ten. (Course ≥ 5, Aplication ≥ 5) The failure of one part requires to pass both parts again in the retake session.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Ucenic Camelia Ioana	
	Teachers in charge of application	Bacila Gabriela	

Date of approval in the department IF ________________________	Head of department Prof.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	47.00

2. Data about the subject

2.1 Subject name				Cutting Processing Technologies I			
2.2 Subject area				Manufacturing Engineering			
2.3 Course responsible/lecturer				Prof.Dr.Eng. Ancau Mircea, mircea.ancau@tcm.utcluj.ro			
2.4 Teachers in charge of seminars				Lect.dr.eng.Radu Adrian, radu.adrian@tcm.utcluj.ro			
2.5 Year of study	3	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	14
Supplementary study in the library, online and in the field	14
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	10
Exams and tests	10
Other activities	-

3.7	Total hours of individual study	62
3.8	Total hours per semester	104
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	Machine parts, Descriptive Geometry and Technical Drawing
4.2	Competence	C2.5. Specific professional development of industrial engineering projects based selection, combination and use of knowledge, principles and methods from the field of basic sciences of industrial engineering domain and their association with drawing –technical graphics.

5. Requirements (where appropriate)

5.1	For the course	Projector multi-media, blackboard
5.2	For the applications	Equipment from the laboratory “Manufacturing Technologies”

6. Specific competences

Professional competences	**C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology. **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. **C4.3.** Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. **C4.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. **C4.5.** Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To obtain knowledge about manufacturing technologies, machine-tools and cutting-tools, cutting processes.
7.2	Specific objectives	To know theory, methods and fundamental principles of machining technologies design, specific to the field of industrial engineering. To use the basic knowledges to explain and analyze different manufacturing technologies from industrial engineering. To calculate the influence of manufacturing errors for different cutting technologies. To be capable to establish the proper orientation of a specific type of raw material into a clamping device, in order to minimize the value of manufacturing errors. To determine the magnitude of cutting forces and cutting moments, the value of the stress I the cutting plan, the value of the consumed power in the cutting process, in order to correctly set-up a technological process. To apply the learned methods and principles to design a manufacturing process, on clasic or modern machine-tool without/with CNC, with well defined input data and qualified assistance. To use criteria and standard evaluation methods to appreciate the quality, the advantages and limitations of manufacturing technologies on classic or CNC machine-tools or on flexible manufacturing systems. To be able to make professional designs of technological processes specific to industrial engineering field, including CAM

		programmes.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Introduction. Generalities concerning the manufacturing technologies. Main features of manufacturing technologies.	Exposing, problems solving	Computer, video-projector
The mechanics of chip formation. Orthogonal cutting. Cutting forces.		
The mechanics of chip formation. Merchant's circle. Cutting speeds, Stresses, Specific energies.		
The machining accuracy. Different manufacturing errors.		
The machining accuracy. The influence of machine-tool rigidity on machining accuracy. The part rigidity.		
The machining accuracy. The influence of cutting-tool rigidity on machining accuracy. Thermic deformation.		
The machining accuracy. The influence of machine-tool wear on machining accuracy.		
The machining accuracy. The cutting-tool wear. Case 1: on the end-relief face; Case 2: on the rake face.		
The machining accuracy. Internal stress. The vibrations of the technological system.		
The machining accuracy. The quality and integrity of the machined surfaces. Cutting fluids.		
The machining accuracy. The calculation of total machining error.		
The machining accuracy. Statistical interpretation of machining errors.		
The machining accuracy. Normal like distribution curves.		
Basic concepts about manufacturing technologies design.		
Bibliography 1. Ancău, M. Manufacturing Technologies. Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2003. 2. DeGarmo, E.P. s.a. Materials and Processes in Manufacturing. Prentice-Hall, New York, 8th Ed., 1997. 3. Kalpakjian, S. Manufacturing Processes for Engineering Materials. Adison Wesley Longman Inc., 3rd Ed., 1997.		

8.2. Applications/Seminars	Teaching methods	Notes
The set-up to dimension of the cutting-tool. Statistical interpretation of set-up errors.	Plan of laboratory session	Individually or group solving of laboratory themes, under the supevision of a teacher
Experimental determination of the static rigidity of a lathe.		
Experimental determination of the dynamic rigidity of a lathe.		
Experimental determination of the cutting-tool wear.		
Experimental determination of the cuttin-tool temperature influence on manufacturing accuracy.		
The analysis of different manufacturing technologies applied on a universal lathe.		
The analysis of different manufacturing technologies applied on a universal milling machine.		
Bibliography		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The acquired competences are necessary to make semester or year projects, diploma project, and later on, to solve different practical problems in future industry production.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the

			final grade
10.4 Course	Solve two theoretical subjects	Writing – duration 1hour	60%
10.5 Applications	Solve one problem	Writing – duration 0.5 hour	40%
10.6 Minimum standard of performance			
The solving of each of the three subjects (2 theoretical + 1 problem) by minimum of 5 score.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof.dr.eng.Mircea Ancau	
	Teachers in charge of application	Lect.dr.eng. Radu Adrian	

Date of approval in the department IF

____

Head of department
Lect.dr.ing. Adrian Trif

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*48.00*

2. Data about the subject

2.1	Subject name			Nonconventional Technologies			
2.2	Subject area			Manufacturing engineering			
2.3	Course responsible/lecturer			Prof.PhD.Eng. Nicolae Balc, Nicolae.Balc@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Senior Lect. PhD.Eng. Razvan Pacurar, Razvan.Pacurar@tcm.utcluj.ro			
2.5 Year of study	III	2.6 Semester	2	2.7 Assessment	Exam	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					25
Supplementary study in the library, online and in the field					15
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					24
Tutoring					4
Exams and tests					6
Other activities					

3.7	Total hours of individual study	74
3.8	Total hours per semester	130
3.9	Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	Physics, Manufacturing basics, Quality engineering, Computing for engineers, Materials, Heat treatments
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Laboratory of Non-conventional technologies

6. Specific competences

Professional competences	C4.1. Describing the theory, methods and basic principles for designing the processes specific to machine building technology. C4.2. Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. C4.3. Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. C4.4. Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. C4.5. Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT3. Objective self-evaluation of the need of continuous training for labour market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Working principle of non-traditional manufacturing technologies, related equipment and applications. Prototyping technologies and rapid tooling for small volume production of complex parts
7.2	Specific objectives	EDM, USM, ECM, EBM, LBM, PAM, WJC processes

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Introduction to non-traditional processes. Type of energy used for material removing, effects onto the surface of the parts, technological parameters.	ppt. slides, interactive teaching, case studies, best practices examples, industrial applications of NT and RP/RT technologies contracts with companies, involvement of students in industrial partnerships	
2. EDM-Electrical Discharge Machining. Process parameters, type of electrods, industrial applications, EDMWC-EDM Wire Cutting, Micro-drilling.		
3. ECM-Electro-Chemical Machining. Equipment, working principle, basic electro-chemical reactions, modeling the ECM process (Ohm-Faraday), industrial applications		
4. USM-Ultra-Sonic Machining. Working principle, process parameters, industrial applications.		
5. EBM-Electron Beam Machining. Working principle, equipment, process parameters, industrial applications.		
6. LBM-Laser Beam Machining. Working principle, equipment, process parameters, industrial applications.		
7. PAM-Plasma Arc Machining. Working principle, equipment, process parameters, industrial applications.		
8. WJC-Water Jet Cutting. Working principle, equipment, process parameters, industrial applications.		

9. Introduction to Rapid Prototyping.		
10. FDM-Fused Deposition Modeling, LOM-Laminated Object Manufacturing. Working principle, equipment, process parameters, industrial applications.		
11. SLS/SLM – Selective Laser Sintering/ Selective Laser Melting. Working principle, equipment, process parameters, industrial applications.		
12. VC-Vacuum Casting and Silicone Rubber Molding. Working principle, equipment, process parameters, industrial applications.		
13. Metal Spray Tooling for injection molding. Working principle, equipment, process parameters, industrial applications.		
14. Rapid Metal Casting of complex metal parts in small batches. Working principle, equipment, process parameters, industrial applications.		

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2. Bâlc, N. Tehnologii Neconvenţionale, Cluj-Napoca, Editura Dacia, 2001;
3. Marinescu, N.I., ş.a. Prelucrări neconvenţionale in construcţia de maşini, Ed.Tehnică, Bucureşti, 1993;
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5. Berce, P., Balc, N., s.a. Aplicatiile medicale ale tehnologiilor de fabricatie prin adaugare de material, Ed Acad. Ro, 2015;
6. Gebhardt, A., s.a, 3D Printing-Understanding Additive Manufacturing, Hanser, 2018.

8.2. Applications/Seminars	Teaching methods	Notes
1. Finishing the molds cavities by EDM sinking. EDMWC-cutting complex profiles into hard metals.		
2. Rapid Prototyping of the plastic parts and Master Models		
3. Rapid Prototyping of the metal parts by SLS and SLM		
4. Vacuum Casting and Silicone Rubber Molding		
5. Metal Spray Tooling for injection molding of complex plastic parts		
6. Water Jet Machining (cutting and milling) of 2D shapes in different materials		
7. Rapid Metal Casting of complex metal parts in small volume production		

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2. Bâlc, N. Tehnologia Neconvenţionale, Cluj-Napoca, Editura Dacia, 2001 ;
3. Bâlc, N., Gyenge, Cs., Berce, P., Proiectare pentru Fabricaţia Competitivă, Cluj-Napoca, Ed. Alma Mater, 2006;
4.Berce, P., Balc, N., s.a. Aplicatiile medicale ale tehnologiilor de fabricatie prin adaugare de material, Ed Acad. Ro, 2015;
6. Gebhardt, A., s.a, 3D Printing-Understanding Additive Manufacturing, Hanser, 2018.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Industrial companies are expecting the employers to have knowledge and abilities, to handle modern equipment used within the non-traditional processes, in order to be able to produce complex shapes in different materials, where clasical processes are difficult to be involved. More and more Romanian companies are setting up R&D Groups to develop new products. That is why the requirement coming from industry was for the engineers to know and to be able to handle new additive manufacturing

processes, rapid tooling technologies for rapid product development.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Level of understanding of the taught processes, working principles, parameters, effects. Ability to use the knowledge in order to undertake practical tasks, select appropriate routes to manufacture specific shapes, in specific materials in different size batches	Written exam, individual subjects. Each student gets 3 examination subjects (S1, S2, S3)	60%: the subjects S1, S2, S3 have 20% weight each
10.5 Applications	Individual project work Laboratory classes	Evaluate the project work report	40%
10.6 Minimum standard of performance: 50%			
The final credit can be received only if each of the mark's components is fulfilled: 30% (out of 60% written examination) + 20% (out of 40%-report of the project work)			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Prof.PhD.Eng. Nicolae BÂLC	
	Teachers in charge of application	Senior Lect. PhD.Eng. Razvan PACURAR	

Date of approval in the department: IF	Head of department, Lect. PhD.Eng. Adrian TRIF
Date of approval in the faculty: CM	Dean, Prof.PhD.Eng. Corina BÎRLEANU

DISCIPLINE SHEET

Course name	Fundamentals of Metal Forming
Field of study	Industrial Engineering
Specialization	Manufacturing Engineering
Discipline code	
Teacher (Name & e-mail address)	Prof. Dorel BANABIC, banabic@tcm.utcluj.ro
Collaborators	
Department	Manufacturing Engineering
Faculty	Machine Building

Sem.	Course name	Course	Applications			Course	Aplications			Indiv. Study	TOTAL	Credit	Assessment
		[hours/week]				[hours/week							
			S	L	P		S	L	P				
5	Fundamentals of Metal Forming	**2**		**1**		**28**		**14**		**49**	**91**	**4**	**Exams**

Learning Outcomes:
Knowledge/understanding:
• Theoretical fundaments of metal forming processes • Assesment of sheet metal formability • Mechanics of metal forming processes
Theoretical Skills:
• Determination of the mechanical parameters used in the FE codes • Processing, evaluation and interpretation of the uniaxial tensile test data • Analysing the mechanics of metal forming processes • Analysing and evaluation of the formability index used for assesment of formability of metal forming processes
Practical Skills:
• How to use an uniaxial tensile testing machine • How to use a formability testing device • How to use an strain measurement video system • How to use a computational program for FLD prediction

Requirements (if any)
• General knowledge in Mathematics • General knowledge in Mechanics • General knowledge in Strenght of Materials • General knowledge in Material Science • General knowledge in Finite Element Method • General knowledge in measurement of mechanical data

A. Titles of lectures	
1	**Introduction** Specific problems of the Metal Forming processes Clasification of the Metal Forming processes
2	**Elements of Theory of Plasticity** Elements of Metallurgical Mechanics. 1. Structure of materials. 2. Mechanism of plastic deformation.
3	**Elements of Theory of Plasticity** Fundamental equations of the Theory of Plasticity 1. Equilibrium equations **2.** Strains equations. Compatibility equations
4	**Elements of Theory of Plasticity** 3. Constitutive equations a. Yield criteria. Isotropic yield criteria
5	**Elements of Theory of Plasticity** 4. Constitutive equations b. Anisotropic yield criteria c. Normality rule

6	**Elements of Theory of Plasticity** Methods to solve the models 1. Slab methods 2. Upper and lower bounds method 3. Finite Elements method
7	**Tribology in metal forming** 1. Friction models 2. Methods to determine the friction coefficient 3. The importance of friction in metal forming processes
8	**Formability in metal forming processes** **1.** Definition of the formability concept **2.** Assessment methods of formability
9	**Formability in metal forming processes** **3.** Forming Limit Diagram method **a.** Definition of the FLD concept **b.** Definition of the forming limits **c.** Test to determine forming limits
10	**Formability in metal forming processes** **3.** Forming Limit Diagram method **d.** Theoretical models for FLD predictions e. Commercial programmes for FLD predictions **f.** Application of the FLD in industry
11	**Materials in metal forming** 1. Standardization of the Materials 2. Steels. HSS. DP. TRIP. Classifications. Utilization. 3. Aluminium and its alloys 4. Magnesium and its alloys. 5. Copper and its alloys. 6. Titanium and its alloys. 7. Superplastic materials. 8. Comparative analysis of materials
12	**Mechanics of bending process** 1. Stress and strains state 2. Determination of the neutral zone 3. Determination of the bending moment
13	**Mechanics of the deep-drawing process**
14	**Mechanics of the stretching and bulging processes**

B1. Titles of applications	
1	Uniaxial tensile test. Determination of the yield stress, strenght stress, uniform elongation and total elongation
2	Uniaxial tensile test. Determination of the strain hardening curve. Identification of the mechanical parameters based on the strain hardening curve. Prediction of the strain hardening curve.
3	Uniaxial tensile test. Determination of the anisotropy coefficients. Determination of the strain sensitivity index
4	Uniaxial compresion test. Determination of the strain hardening curve
5	Assesment of formability. Technological tests. Erichssen method
6	Assesment of formability. Forming Limit Diagram method. Measurement of strains. Determination of the limit strains.
7	Prediction of the Forming Limit Diagram using the FORMCERT program. Comparison between experiments and prediction.

B2. Laboratory (Room/surface, address) G9/140 m^2 , M205D/65 m^2 B-dul Muncii 103-105

Equipment	Short description	Year of aquisition
Computer network	PC- Procesor Quadro Core	2011
DynaForm, ABAQUS, AUTOFORM, FORM-CERT	Commercial FE codes: FLC prediction code: FORM-CERT	2007, 2012
Tensile test machine INSTRON 400kN	Tensile test machine for uniaxial and compresion tests in dynamic state	2006
Tensile test machine Zwick 150 kN	Tensile test machine for uniaxial and compresion tests	2007

Hydromechanical device	Used for FLD determination	2007
ARAMIS System	Optical system for strains measurement of sheet metals	2008
Benedetti CNC hydraulic press 1200 KN	Industrial scale deep-drawing tests	2010
Erichsen equipment	Used for FLD determination and for deep drawing, bulging and stretching tests	2012

C. Individual study

- Mechanical tests of materials
- Technological tests of materials
- Theory of Plasticity

Structure of individual study	Study of course materials	Homework, project work	Study of seminar / lab. materials	Time for examination	Study of additional reference materials	Total time of individual work
No. of hours	14	-	14	2	19	49

D. Strategy and teaching methods

- All the lectures are in electronic format.
- Multimedia systems are used for lecture presentations (animations, movies, complex figures, etc)
- e-Learning using TALAT, ALUMATTER.info and CIRP-edia platforms.
- Interactive aplications for laboratories using ALUMATTER.info platform.

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3. Backhofen W., Deformation Processing, Addison-Wexley Publishing Comp., Massachusetts, 1972
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e-Learning courses

1. Hirsch, J., Wagner S., **Banabic D.** – Alumatter - Metal Forming-, www.alumatter.info
2. CIRP-edia - Encyclopedia of Production Engineering, http://www.cirp.net/

Assessment	
Assessment method	Writen exam containing two theoretical subjects and an application.
Note components	Exam (E mark), Lab (L mark)
Calculation formula	N=0,75E+0,25L Conditions to obtain the credits: N>5; L>5.

DISCIPLINE SHEET

Date of filling in: dd.mm.yyyy		**Title Surname Name**	**Signature**
	Lecturer	Prof. Dorel BANABIC	
	Teachers in charge of application		

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*50.00*

2. Data about the subject

2.1	Subject name			Design of Cutting Tools			
2.2	Subject area			*Manufacturing engineering*			
2.3	Course responsible/lecturer			*Prof.eng. Borzan Marian, PhD – mborzan@yahoo.com*			
2.4	Teachers in charge of seminars			*S.l.eng. Adrian Trif, PhD – aditrif2002@yahoo.com* *Dr.eng. Veroniu Radutiu*			
2.5 Year of study	3	2.6 Semester	2	2.7 Assessment	Exam	2.8 Subject category	DID/DOB

3. Estimated total time

3.1 Number of hours per week	6	3.2 of which, course:	3	3.3 applications:	3
3.4 Total hours in the curriculum	84	3.5 of which, course:	42	3.6 applications:	42

Individual study	hours
Manual, lecture material and notes, bibliography	14
Supplementary study in the library, online and in the field	21
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	7
Tutoring	2
Exams and tests	2
Other activities	

3.7	Total hours of individual study	46
3.8	Total hours per semester	130
3.9	Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A

5.2	For the applications	

6. Specific competences

Professional competences	C4.1. Describing the theory, methods and basic principles for designing the processes specific to machine building technology. C4.2. Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. C4.3. Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. C4.4. Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. C4.5. Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs C5.1. Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. C5.2. Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. C5.3. Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology C5.4. Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. C5.5. Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT3. Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Develop skills in the design and use of cutting tools in support of vocational training
7.2	Specific objectives	1. Assimilation of theoretical knowledge on the design and methods of selection and use of cutting tools used in metalworking

		2. Obtaining skills to use, control and measurement of the main types of cutting tools

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Synthesis of the main principles to choice constructive geometric parameters of cutting tools (Choosing tool clearance; Choosing rake angle; Selection of cutting edge angle; Choosing approach angle)	Exposure, discussions	Video projector
2. Turning tools: - Overview. Classifications. Types and constructive solutions		
3. - Choosing of data cutting to turning.		
4. - ISO symbols of small plates and cutting tool bodies. Practical examples. Correlation of symbols.		
5. Profile cutting tools: - Overview. Classifications. Advantages. Construction types. Applications. Profiles. - Determination of profile to profile disc-cutting tool		
6. - Geometry design of disc profile cutting tool - Determination of size to profile disc-cutting tool		
7. - Designing of profile prismatic-cutting tool - Cutting tools for machining of helical ruled surfaces		
8. Milling cutters: - Shape of tooth at milling cutter - Determination of size to cylindrical milling cutter		
9. - Cylindrical milling cutter with helical teeth. Choice of rotation - Profile milling cutters. Making of backing-off clearan		
10. Tools for machining holes Drills: - Overview. Constructive geometry of helical drill - Functional geometrical parameters and principles of sharpening		
11. - Constructive types of drills. Geometries, applications. - Mechanical sharpening of helical drills		
12. Reamers: - Overview. Geometry of fix reamer. - Adjustable reamers		
13. Tools for machining threads Taps: - Overview. Geometry of tap. Form channels for chips evacuation.		
14. Screw plates - Overview. Geometry of cylindrical screw plate. Form channels for chips evacuation		
Bibliography		

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[BOR.18] Borzan, M., Trif A., Miron-Borzan C.S., Scule aschietoare. Geometrii. Editura UT Press, ISBN 978-606-737-327-1, 2018
[BOR'01] Borzan, M., Proiectarea sculelor profilate. Ed. Studium, Cluj-Napoca, ISBN 973–9422–91-8, 2001.
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https://www.scribd.com/doc/309311984/Sistem-Suporti
[SAB'03] Sabău R.G., Borzan M., Scule aşchietoare. Modelare, analiză, măsurare. Aplicaţii. Editura Alma Mater, Cluj-Napoca. Vol. I, ISBN 973-8397-31-6, 2003.
*** Catalogues of cutting tools from specialized firms (Sandvik Coromant, Seco Tools, Walter Tool, Dormer, Kyocera, and so on)

8.2. Applications/Seminars	Teaching methods	Notes
1. Measuring linear and angular dimensions of cutting tools using universal microscope	Exposure and applications	Universal microscopes, system of acquisition and processing of measurement data QM-Data200, computer, video projector, callipers, micrometers, comparators, bevel angles, and so on
2. Measuring geometrical and constructive parameters of cutting tools for turning		
3. Processing technology of cutting tool for turning		
4. Measuring geometrical and constructive parameters of helical drill		
5. Mechanical sharpening of helical drills		
6. Measuring geometrical and constructive parameters of disc profile cutting tool		
7. Measuring geometrical and constructive parameters of broach		
8. Sharpening of cylindrical milling cutter with helical teeth		
9. Measuring geometrical and constructive parameters of cylindrical face milling cutter		
10. Measuring geometrical and constructive parameters of type ROMASCON milling cutter		
11. Measuring geometrical and constructive parameters of tap		
12. Measuring geometrical and constructive parameters of profile prismatic-cutting tool		
13. Sharpening of hack-saw blade		
14. Synthesis work. Assessment activities.		

Project:
Designing a representative type of cutting tool (design)

Bibliography

[ABR'82] Abrudan, G., ş.a., - Proiectarea sculelor aşchietoare, Litografia IPC-N, 1982.
[ABR'87] Abrudan, G., ş.a., - Aşchiere şi scule aşchietoare, Îndrumător de lucrări, Lito IPC-N, 1987.
[BEJ'89] Bejan, E., ş.a., - Scule pentru maşini-unelte, Litografia IPC-N, 1989.
[BOR'18] Borzan, M., Trif A., Miron-Borzan C.S., Scule aschietoare. Geometrii. Editura UT Press, ISBN 978-606-737-327-1, 2018
[BOR'01] Borzan, M., Proiectarea sculelor profilate. Ed. Studium, Cluj-Napoca, ISBN 973–9422–91-8, 2001.
[BOR'17] Borzan, M., Proiectarea sculelor aschietoare. Suport de curs. Licenta TCM. http://documents.tips/documents/proiectarea-sculelor-aschietoare-5660a519b15b7.html

	https://www.scribd.com/doc/309311984/Sistem-Suporti
[SAB'03]	Sabău R.G., Borzan M., Scule aşchietoare. Modelare, analiză, măsurare. Aplicaţii. Editura Alma Mater, Cluj-Napoca. Vol. I, ISBN 973-8397-31-6, 2003.
[RAD'14]	Radutiu V., Borzan, M., Elemente de proiectare pentru cutitul de strung. ISBN 978-973-662-969-3, Editura U.T.Press Cluj-Napoca, 2014.
***	Catalogues of cutting tools from specialized firms (Sandvik Coromant, Seco Tools, Walter Tool, Dormer, Kyocera, and so on)

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Acquired skills will be needed to employees who work in the areas of cutting processing and technological engineering

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Solving a problem (A) and two theoretical subjects (E)	Written test - during of evaluation: two hours	70%
10.5 Applications	Solving applications in the field of measurement and control of cutting tools (L) Designing a representative type of cutting tool (P)	Practical test - during of evaluation: one hour Practical test - during of evaluation: one hour	10% 20%
10.6 Minimum standard of performance:			
The final credit can be received only if each of the mark's components is fulfilled: N≥5; A≥5; E≥5; L≥5; P≥5 N =A + E + L + P			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Prof.eng.,PhD Marian Borzan	
	Teachers in charge of application	S.l.eng.,PhD Adrian Trif	
		dr.eng., Veroniu Radutiu	

Date of approval in the department of Manufacturing Engineering ________________________	Head of Department Manufacturing Engineering S.l.dr.ing. Adrian TRIF
Date of approval in the Faculty of Machine Building ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	51.00

2. Data about the subject

2.1	Subject name			Machine Tools I			
2.2	Subject area			Machine Tools			
2.3	Course responsible/lecturer			Prof. PhD eng. Cornel Ciupan, cornel.ciupan@muri.utcluj.ro			
2.4	Teachers in charge of seminars			Lecturer PhD.eng. Emanuela Pop, emanuela.pop@muri.utcluj.ro			
2.5 Year of study	III	2.6 Semester	II	2.7 Assessment	E	2.8 Subject category	DID/DOB

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	104	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	20
Supplementary study in the library, online and in the field	27
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	6
Tutoring	3
Exams and tests	4
Other activities	2

3.7	Total hours of individual study	62
3.8	Total hours per semester	104
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	Materials, mechanics, mechanisms, strength of materials
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	
5.2	For the applications	Laboratory of machine tools

6. Specific competences

Professional competences	**C3.1.** Describing the basic theories and methods in the field of computer programming and applied informatics specific to machine building technology. **C3.2.** Using the basic knowledge associated to software programs and digital technologies for explaining and interpret the issues of conceive and computer aided design of products, processes and technologies, in experimental and theoretical investigation of computerized data processing, specific to industrial engineering in general, and particularly in machine building technology. **C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The students must know and understand the kinematical structure and the architecture of machine tools.
7.2	Specific objectives	The students will be able: • to understand the operation of machine tools • to design the kinematical structure of a manufacturing equipment • to make the kinematical calculations for any manufacturing equipment • to size the main components of machine tools.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Processes and gear cutting machines. Rack shaping machine. Gear shaping machines.	Lecture participatory debate, exposure	
2. Gear hobbing machines. Gear grinding machines		
3. Gear hobbing machines for helical gears.		
4. NC machine tools. General considerations		
5. Motors and equipment for NC machine tools		
6. CNC lathes.		
7. CNC milling machines.		
8. Turning-milling machining centers		
9. CNC gear cutting machines		
10. Maintenance and operation of machine tools		
11. Hydraulic operation of machine tools. General aspects. Pumps		

and hydraulic motors		
12. Hydraulic distributor and pressure regulator.		
13. Hydraulic flow control device		
14. Hydraulic drive schemes specific to machine tools		

Bibliography

[BOT 77] Botez, E., ş.a. Maşini unelte şi agregate, Editura Tehnică, Bucureşti 1981
[CIU 2014] Ciupan C. Masini unelete. Notite de curs.
[GAL94] Galis, M., ş.a. Proiectarea maşinilor unelte. Transilvania Press, Cluj-Napoca, 1994
[GHE 83] Gheghea, I., ş.a. Maşini unelte şi agregate, Editura EDP, Bucureşti 1983
[HEL08] Helmi A. Youssef, Hassan El-Hofy. Machining technology: machine tools and operations. CRC Press 2008.
[JOS07] PH Joshi. Machining technology: machine tools and operations. Tata Mc Grow-Hill Publishing Company, New Delhi, 2007

8.2. Applications/Seminars	Teaching methods	Notes
1. RPO 200 grinding machine	Laboratory	
2. Round grinding machine RU 100.		
3. Gear hobbing machine FD 400.		
4. Machining parts on a CNC milling machine		
5. Pumps and hydraulic motors		
6. Hydraulic distributors. Taps and sense valves. Pressure valves		
7. Visit to a factory with the appropriate tools in the field of machine tools		

Bibliography

[POP16] Pop E. Ciupan C. Steopan M. Masini unelte. Indrumator de lucrari de laborator. Editura UT PRESS, Cluj-Napoca, 2016

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The course content is consistent with what is done in other universities in the country and abroad and it is appropriate to requirements of labor market.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	correctness and completeness of knowledge; logical consistency;	written paper: 2 hours	60%
	interest to the individual study	active participation	10%
10.5 Applications	ability to work with assimilated knowledge	the writing test	20%
	interest to the applications	active participation	10%
10.6 Minimum standard of performance			
knowledge of the fundamentals of theory, solving a simple applications The final credit can be received only if each of the mark's components is fulfilled: 50%			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer	Prof. PhD eng. Cornel Ciupan	
	Teachers in charge of application	Lecturer PhD.eng. Emanuela Pop	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*52.10*

2. Data about the subject

2.1	Subject name	Welding Technologies					
2.2	Subject area	Welding					
2.3	Course responsible/lecturer	Assoc. Prof. PhD.Eng. Mircea MERA, Mircea.Mera@ tcm.utcluj.ro					
2.4	Teachers in charge of seminars	Lect.PhD.Eng. Adrian POPESCU, Adrian.Popescu@ tcm.utcluj.ro					
2.5 Year of study	3	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DS/DOP

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	10
Manual, lecture material and notes, bibliography	5
Supplementary study in the library, online and in the field	2
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	1
Tutoring	-
Exams and tests	2
Other activities	

3.7	Total hours of individual study	10
3.8	Total hours per semester	52
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	General knowledge of chemistry, material resistances, material study.
5.2	For the applications	

6. Specific competences

Professional competences	C4.1. Describing the theory, methods and basic principles for designing the processes specific to machine building technology. C4.2. Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. C4.3. Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. C4.4. Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. C4.5. Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs
Cross competences	

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	
7.2	Specific objectives	

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	Welded joints. Definistions, Clasification. Brief history.		
2	Welding joints. Representation of the weldings on thechical drawings. Clasification of the welding methods.		
3	Electric arc and flame welding. Special welding methods through melting.		
4	Weiding processes and technologies in the solid form of the materials. - through electrical resistance, friction, ultrasound, diffusion, cold explosion, etc.		
5	Thermal cutting methods of the metals. Other related welding processes.		
6	Coating technologies through metal plating. Metal bonding.		
7	Addition material for: welding, coating and other related processes.		
8	Materials and alloys weldability. Steel and alloys for welded constructions.		
9	Tensions and deformations on welding. Structude and defects of the welded joints.		
10	Constructive systems of the welded constructions. Execution classes of the welded joints. Fmning and backing of the welded joints.		
11	Calculation elements for the resistance of the welding joints. Design principles of the welded constructions.		
12	Operations Technologies of the assembly-welding.		
13	After welding operations technologies.		

14	Quality assurance of the welded joints. Testing elements of the welded joints.		

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[Pop84] Popovici, V., ş.a. Ghidul lucrărilor de sudare, tăiere şi lipire. Ed.Scrisul Românesc, Craiova, 1984. [Bic78] Bicsak, E. Tehnologia Construcţiilor Sudate, Ed. IPCN, 1978.
[Mit92] Mitelea, I.,ş.a. Materiale şi tratamente termice pentru sudură. Ed.Vest, Timişoara, 1992.
[Vid96] Vida-Simiti, l.,ş.a. Prelucrabilitatea materialelor metalice. Cap.5, Sudabilitatea. Ed. Dacia, Cluj-Napoca, 1996.
[Deh98] Dehelean, D. Sudarea prin topire. Ed.SUDURA SRL, Timişoara, 1998 [Zgu83] Zgură, G.,ş.a. Tehnologia sudării prin topire. EDP, Bucureşti, 1983.

8.2. Applications/Seminars		Teaching methods	Notes
1	Work safety rules for the welding laboratory works. Determination methodics of the specific material consumtion and of the productivity coefficients in case of metal welding.		
2	Material consumption determination in case of electric arc and coated electrode welding, gas protective welding MIG/MAG and WIG, electric arc welding under protective flux and flame welding of the metals.		
3	Working parameters determination in case of solid state welding, through pressure an electrical resistance, through friction and with stored energy		
4	Material consumption determination in case of oxygen flame cutting of the metals. Metal coating with flame, electric arc and plasma processes studies.		
5	Practical determination of the steel stability.		
6	Mechanical and technological tests of the welded joints.		
7	Non destructive control of the welded joints. Penetrating liquids control, magnetic control, ultrasonic fault and penetrating radiations control.		

Bibliography

[Pop84] Popovici, V., ş.a. Ghidul lucrărilor de sudare, tăiere şi lipire. Ed.Scrisul Românesc, Craiova, 1984. [Bic78] Bicsak, E. Tehnologia Construcţiilor Sudate, Ed. IPCN, 1978.
[Mit92] Mitelea, I.,ş.a. Materiale şi tratamente termice pentru sudură. Ed.Vest, Timişoara, 1992.
[Vid96] Vida-Simiti, l.,ş.a. Prelucrabilitatea materialelor metalice. Cap.5, Sudabilitatea. Ed. Dacia, Cluj-Napoca, 1996.
[Deh98] Dehelean, D. Sudarea prin topire. Ed.SUDURA SRL, Timişoara, 1998 [Zgu83] Zgură, G.,ş.a. Tehnologia sudării prin topire. EDP, Bucureşti, 1983.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Relationship between subject content and expectations of professional community, professional associations and employers in the field of the study programme

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	- To know the terminology used in the field of welding technologies; - To know the processes and technologies used for welding, cutting and gluing of metals;	The exam consists of the oral examination of the	40%

	- Know the welding equipment and its technological possibilities - Know methods and devices for control of welded joints; - To know the technological particularities related to the welding of the main materials used in metallic constructions (alloyed steels, metals and non-ferrous alloys, cast iron, etc.)	knowledge, Grid test (1 hour) Case study.	30% 15%
10.5 Applications	- Assessing the ability to use the methods correctly, the models presented in the course - Assessment of the correct use of welding equipment, welding joints, test apparatus and equipment;	Presentation and support of experimental results and conclusions of laboratory work	15%
10.6 Minimum standard of performance			
To know the welding processes most often used in industrial practice, to determine the values of the parameters of the welding regime, to make a case study for a concrete situation, in terms of autonomy and professional independence.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Assoc. Prof. PhD.Enq. Mircea MERA	
	Teachers in charge of application		
		Lect.PhD.Eng. Adrian POPESCU	

Date of approval in the department IF ________________________	Head of department Lect. dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	52.20

2. Data about the subject

2.1	Subject name			Digital Command of Fabrication Processes			
2.2	Subject area			Manufacturing engineering			
2.3	Course responsible/lecturer			Ph.D. eng. Assoc. Prof. Costin Ovidiu, Ovidiu.Costin@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Ph.D. eng. Assoc. Prof. Costin Ovidiu, Ovidiu.Costin@tcm.utcluj.ro			
2.5 Year of study	III	2.6 Semester	2	2.7 Assessment	Exam	2.8 Subject category	DS/DOP

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	4
Supplementary study in the library, online and in the field	2
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	1
Tutoring	1
Exams and tests	2
Other activities	

3.7	Total hours of individual study	10
3.8	Total hours per semester	52
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	Blackboard, projector multi-media
5.2	For the applications	Equipment from the laboratory, Free software for systems

		command

6. **Specific competences**

Professional competences	**C3.1.** Describing the basic theories and methods in the field of computer programming and applied informatics specific in machine building technology **C3.2.** Using the basic knowledge associated to software programs and digital technologies for explaining and interpret the issues of conceive and computer aided design of products, processes and technologies, in experimental and theoretical investigation of computerized data processing, specific to industrial engineering in general, and particularly in machine building technology. **C3.3.** Applying basic principles and methods of software programs and digital technologies for programming, database implementation, assisted graphics, modeling, computer aided design of products, processes and technologies, investigation and computerized data processing specific to industrial engineering in general, and particularly to machine building technology. **C3.4.** Appropriate use of standard assessment criteria and methods to assess the quality, advantages and limitations of software programs and digital technology in order to be used in specific tasks of industrial engineering in general, and particularly machine building technology. **C3.5.** Elaboration of the professional projects specific to industrial engineering, in general and to machine building technology, in particular, on the basis of selection, combination and use of principles, methods, digital technologies, information systems and software tools dedicated to the field.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	Develop the competences in the field of digital command systems at the fabrication processes in the context of permanent evolution of the command equipment
7.2	Specific objectives	Identifying of some different command systems and their functional component blocks which compose these systems using in account the functional demands even of the machine tools or of the fabrication processes which integrated these machines Develop the capabilities to understand the functioning/definition/conception of the integrated fabrication system taking in account the informational command flux respectively the command system which coordinates these

8. **Contents**

8.1. Lecture (syllabus)	Teaching methods	Notes
C1. Basic knowledge of manufacturing systems commanding. Symbols. Components Basic concepts of processing systems and the running precision of Machines Tools	Exposure, Discusions	
C2. Manufacturing systems command; control and command system		
C3. Data (sygnals) processing in manufacturing systems		

C4. Digital command		
C5. Combinational logic circuits		
C6. Sequential logic circuits		
C7. The microprocessor in manufacturing systems command; microprocessor systems		
C8. Microcontrollers; structure/ bloc scheme of a microcontroller system; Examples of microcontroller command devices		
C9. Sensors and transducers used in manufacturing systems		
C10. Programmable automations integrated in manufacturing systems		
C11. Designing principles of digital command schemes		
C12. Digital command schemes specific to the diverse components of a manufacturing system		
C13. Examples of digital command in various cutting processing applications		
C14. Machines, plants, industrial robots, artificial intelligence and digital command		

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1. Bogdanov, M. – Microprocesorul în acţionarea electrică, Editura Facla, Timişoara, 1989, ISBN .
2. Baiesu., A.-S. – Tehnica reglarii automate, Editura MatrixRom, Bucuresti, 2012, ISBN
3. Costin, I., O., - Notiţe de curs
4. Crivii, M. – Automatizari Industriale Discrete, Lito. IPCN, 1984
5. Damian, M., Cărean, Al. – Fabricaţie asistată de calculator, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2003, ISBN .
6. Kuo, C., ş.a. – Sisteme de comandă şi reglare incrementală a poziţiei, Editura Didactică şi Pedagogică, Bucureşti, 1982, ISBN .
7. Moise., - Automate programabile. Proiectare. Aplicatii, Editura MatrixRom, Bucuresti, 2004, ISBN
8. Moise., - Automate programabile de tip industrial, Editura MatrixRom, Bucuresti, 2010, ISBN
9. Staugaard, A.C. – Robotics and AI: An introduction to applied machine intelligence, Prentice Hall Inc., 1987, ISBN .
10. Trifa, V. – Aplicaţii în sisteme logice programate, Editura MEDIAMIRA, Cluj-Napoca, 1995, ISBN .
11. Yoram, K. – Computer Control of Manufacturing Systems, McGraw Hill, 1983, ISBN.

8.2. Applications	Teaching methods	Notes
L1. Lab presentation, directions regarding labour protection. Hardware components of some digital systems. Signals and signal measurement. Elements of the command system of a manufacturing system (parameters, characteristics etc.)	Applications	
L2. Digital circuits: logic combinational circuits; logic sequential circuits; impulse distributors		
L3. Microcontrollers. Familiarization with microcontroller developing systems; developing programs in assembly language for microcontrollers; programming diverse components of a microcontroller (gates, timers- counters, serial interface).		
L4. Sensors and transducers (characteristics, functioning, measurement and testing etc.).		
L5. Programmable automations: configuring, testing, programming. Applications with programmable automations.		
L6. Designing command systems with the help of computers		
L7. Computer drive of a manufacturing system (specific simulation and functional testing soft). Final check of lab activity.		

Bibliography

1. Bostan, E., ş.a. – Sisteme de reglare automata, Culegere de probleme, Editura MatrixRom, Bucuresti, 2011, ISBN
2. Bostan, E., ş.a. – Servomecanisme, Indrumar de laborator, Editura MatrixRom, Bucuresti, 2009, ISBN
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5. Dragomir, O., ş.a. – Programarea in limbaj de asmblare a microcontrolerelor, Editura MatrixRom, Bucuresti, 2013, ISBN
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10. Vacariu, L., ş.a. – Analiza si sinteza dispozitivelor numerice, Indrumator de laborator, Editura U.T.Pres, 2009, ISBN

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The accumulated competence and knowledge are necessary to the every technological engineer which use and interact with an fabrication system or participate to the industrial equipment aquisition or assembly process of fabrication equipment

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The answer to the 4 questions in the field of theoretical concepts and solving 2 problems for designing of some digital command systems	Writing test (mark T)	80 %
10.5 Applications	The answer to the 2 questions which are related with the laboratory contents The activity during classes is appreciated	Writing test (mark A)	20 %
10.6 Minimum standard of performance Correct answer to the 2 question and one problem solved: $N=0,8*T + 0,2*A$			
The final credit can be received only if each of the mark's components is fulfilled: $N\geq5$; $T\geq5$; $A\geq5$			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Ph.D.eng. Assoc. Prof. Ioan Ovidiu COSTIN	
	Teachers in charge of application	Ph.D.eng. Assoc. Prof. Ioan Ovidiu COSTIN	

Date of approval in the department IF ________________________	Head of department Ph.D. eng. Lecturer Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Ph.D. eng. Prof. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	52.30

2. Data about the subject

2.1	Subject name			Manufacturing Bases of Plastic and Composite Parts			
2.2	Subject area			Plastic Materials			
2.3	Course responsible/lecturer			Prof.dr.ing. Hancu Liana- Liana.Hancu@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Conf. dr.ing. Bere Paul- Paul.Bere@tcm.utcluj.ro			
2.5 Year of study	III	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DS/DOP

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14
Individual study					hours
Manual, lecture material and notes, bibliography					3
Supplementary study in the library, online and in the field					3
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					2
Tutoring					
Exams and tests					2
Other activities					3

3.7	Total hours of individual study	10
3.8	Total hours per semester	52
3.9	Number of credit points	2

4. Pre-requisites (where appropriate)

4.1	Curriculum	Machine parts, Technical Drawing, Machine elements
4.2	Competence	Design parts and devices –technical graphics.

5. Requirements (where appropriate)

5.1	For the course	Projector multi-media, blackboard
5.2	For the applications	Equipment from the laboratory

6. **Specific competences**

Professional competences	C4.1. Describing the theory, methods and basic principles for designing the processes specific to machine building technology. C4.2. Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. C4.3. Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. C4.4. Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. C4.5. Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs.
Cross competences	

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	To obtain knowledge about plastic and polymeric based composite materials, and their characteristics and design
7.2	Specific objectives	-to know the plastic and composite materials' properties, structure and components -to know the categories of the plastic materials and their proprieties -to know the main technologies for manufacturing parts made of plastic and composite materials -to design parts made of plastic and composite materials

8. **Contents**

8.1. Lecture (syllabus)	Teaching methods	Notes
1.Introduction to nonmetallic materials and their manufacturing technologies. Advantages, disadvantages and domain of usage	Oral presentation, notes on blackboard and multimedia presentation	Students are encouraged to ask questions
2.General knowledge of plastic materials and their components. Definitions and classifications.		
3.Polymer's rheology and properties of plastic materials		
4.Advantages, disadvantages und applications		
5. Thermoplastic materials and Thermosetting materials		
6. Polimeric based composite materials, characteristics and component		
7. Polimeric materials used for matrix		
8. Materials used for reinforcement		
9. Particularities of the mechanical behavior of the composite's structures, isotropy, anisotropy, elastic modulus, Poisson coefficient		
10. Structure calculus of the polimeric composites		
11.Micro and macromechanics of polimeric based composites		
12. Plastic materials parts design and restraining conditions		

13. Manufacturing technologies for parts made of plastic materials		
14.Manufacturing technologies for parts made of polimeric based composite materials		

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1. Hancu, L., Iancau, H., Tehnologia materialelor nemetalice. Tehnologia fabricării pieselor din materiale plastice, Editura ALMA MATER, 2003, 254 pagini, ISBN 973-8397-34-0.
2.Horun,S., Paunica,T., Sebe,O., Serban,S., Memorator de materiale plastice si auxiliari. Editura Tehnica, Bucuresti,1988.
3.Iancău,H., Nemeş, O., Materiale compozite- concepţie şi fabricaţie, 2002, 155 pagini, editura MEDIAMIRA-Cluj Napoca
4.Tentulescu,D., Tentulescu,L., Fibre de sticla. Edtura Tehnica, Bucuresti, 1994.
5.Seres, I., Injectarea materialelor plastice . Editura Imprimeriei de Vest, Oradea,1996
6.Hancu Liana- Power Point Presentations

8.2. Applications/Seminars	Teaching methods	Notes
1.Practical recognition of plastic materials, reinforcement materials and auxiliary materials	Practical work in the laboratory.	Students are asked and encouraged to ask questions
2.The flowing index determination for some thermoplastic materials		
3. .Case study for the correct design of the parts made of plastic and composites materials		
4. Flow analyses of the plastic materials by using simulation programes.		
5. Calculus of the Fiber Volume Fraction and Fiber Weight Fraction. Case study		
6.Anlyses plastic parts most common defects		
7. Case study for the proper choice of the manufacturing technology for some parts made of plastic materials		

Bibliography

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2. Liana Hancu, Paul Bere, Adrian Popescu, Emilia Sabau, (2015), Materiale compozite cu matrice polimerică, Îndrumător de laborator, Editura UT Press, 190 pag., ISBN 978-606-737-115-4;

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The competences gained by the students are useful for those who are working in the field of manufacturing, in the department of moulds design as well as in the department of technologies design in the plastic parts manufacturing units.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The ability to answer to theoretical questions and to solve practical problems (mark T)	Written test	T is 80%
10.5 Applications	The presence is compulsory (100%). The activity during classes	Questions on each class	20%

	is appreciated (mark L)		
10.6 Minimum standard of performance			
Final mark: N=T+L>5; (T>5 and L>5)			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Prof. eng. Liana HANCU, PhD	
	Teachers in charge of application	Conf. eng. Paul BERE, PhD	

Date of approval in the department IF ________________________	Head of department S.L.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	**53.10**

2. Data about the subject

2.1	Subject name			**Design for Environment**			
2.2	Subject area			Ecology			
2.3	Course responsible/lecturer			Sl.dr.ing. Ancuta Pacurar: ancuta.costea@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Sl.dr.ing. Ancuta Pacurar: ancuta.costea@tcm.utcluj.ro			
2.5 Year of study	III	2.6 Semester	2	2.7 Assessment	Coll.	2.8 Subject category	DS/DOP

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	10
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	-
Exams and tests	-
Other activities	6

3.7	Total hours of individual study	36
3.8	Total hours per semester	78
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Technical Drawing, CAD/CAM, Materials, Product design, Manufacturing Engineering, Non-conventional technologies
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	Video projector
5.2	For the applications	Software SimaPro 7 educational

6. Specific competences

Professional competences	**C6.1.** Defining the concepts, theories, methods and basic principles for planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment. **C6.2.** Using the basic knowledge for explanation and interpretation the issues that arise in planning, management and usage of the manufacturing processes and systems on classic machines and/or CNC as well as in quality assurance and product ascertainment. **C6.3.** Applying of basic principles and methods for planning, management and usage of manufacturing processes and systems, as well as for quality assurance and product ascertainment, under qualified assistance. **C6.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, the advantages and the limits of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment including dedicated software. **C6.5.** Elaborating professional projects by using the principles and methods established in the field of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product inspection.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Knowledge and understanding of environment friendly products development by: - Design and redesign of products for environment depletion reduction (during the all life cycle stages: design, manufacturing, transport, use, repairs, disposal) and eco-efficiency increase; - Comparative analysis of the products ecological impact on the whole products life cycle.
7.2	Specific objectives	Achievements of theoretical and practical skills on design for recovery, reuse, disassembly, waste minimization, energy and raw materials conservation, accidents prevention using dedicated softwares/software moduls such as: SimaPro/LCA, Design for Environment.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Environment and Economy. Environment and its depletion. Environment pollution factors and environment protection goals.	Exposures	Multimedia

Economical development related to Environment Depletion		projector
Sustainable development. Industrial sustainable development. Cleaner technology. Green manufacture		
Concurrent Engineering and Environment. DFE **integration** into DFX family. Life cycle assessment and inventory		
Design for Environment. Design for Environment concept. Design for Environment principles		
Eco Design into Industrial Engineering. Life cycle engineering Methods and tools for products ecological analyze. Ecodesign aspects in engineering		
Product evaluation at the end of the life cycle connected to DFMA method (Design for Manufacture and Assembly).		
Design for Environment Method. DFE databases. Inputs and outputs of analyses. Products redesign based on DFE		
Life Cycle Inventory with SimaPro. Introduction to LCA (Lifecycle Assessment) with Sima Pro. Objectives, databases, used methods, DQI (Data Quality Indicators), SimaPro Processes. Products stages.		
Evaluation of products, processes and services environmental impact using several SimaPro methods (EcoIndicator, CML1992)		
Environment and Economy. Environment and its depletion. Environment pollution factors and environment protection goals.		
Economic development related to Environment Depletion		
Sustainable development. Industrial sustainable development. Cleaner technology. Green manufacture		
Concurrent Engineering and Environment. DFE **integration** into DFX family. Life cycle assessment and inventory		

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1.Popescu S., Kerekes L.,Creţu M., Opruţa D., Roş O., Crişan L., Managementul calităţii Vol. I -Bazele managementului calităţii Cap.10: Asigurarea calităţii mediului, Editura Casa cărţii de ştiinţă, 1999.

2.Roş, O., Frăţilă, D., Proiectare pentru mediu, Editura Casa cărţii de ştiinţă, 2000.

3.Roş, O., Frăţilă, D., Ecoproiectare, Editura Casa cărţii de ştiinţă, 2007.

8.2. Applications/Seminars	Teaching methods	Notes
SimaPro software presentation	Exposure and applications	Software SimaPro 7.
The life cycle assessment for the product		
The technological analysis of the product. Case study		
The implementations of the input data		
The analysis of the environmental impact of the product. Method 1		
The analysis of the environmental impact of the product. Method 2		
Results data. Redesign of the products by SimaPro.		

Bibliography

1.Gyenge, Cs., Roş, O., Gligor, G.,Varga, A., Ingineria simultană în proiectarea fabricaţiei şi a asamblării - Cap 7: Ingineria simultană şi mediul, Editura Alma Mater, 2003.

2.Design for Environment, Ghid pentru DFE, Boothroyd Dewhurst
3.Introduction to LCA with SimaPro7, Software guide, www.pre.nl

9. **Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field**

The skills gained by study of this subject are useful for planning and quality assurance of the products and technologies in the industrial fields; for finding ecological solutions of the products, for case study of the diploma projects.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Exam consists of exposure of 3 theoretical subjects and 2 applications.	Written examination	75%
10.5 Applications	Case study presentation	Examination of laboratory work (case study)	25%
10.6 Minimum standard of performance			
Minimum 5 for each subject of the examination			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Sl.dr.ing. Ancuta Pacurar	
	Teachers in charge of application	Sl.dr.ing. Ancuta Pacurar	

Date of approval in the department IF _________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	Universitatea Tehnică din Cluj-Napoca
1.2 Facultatea	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Ingineria Fabricaţiei
1.4 Domeniul de studii	Inginerie Industrială
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii / Calificarea	Tehnologia Construcţiilor de Maşini (în limba engleza)/Inginer
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	53.20

2. Date despre disciplină

2.1 Denumirea disciplinei	Ecologia sistemelor de fabricație						
2.2 Aria de conţinut	Ecologie						
2.3 Responsabil de curs	Conf.dr.ing. Paunescu Daniela, PhD.; Daniela.Paunescu@tcm.utcluj.ro						
2.4 Titularul activităţilor de seminar / laborator / proiect	Conf.dr.ing. Paunescu Daniela, PhD.; Daniela.Paunescu@tcm.utcluj.ro						
2.5 Anul de studiu	III	2.6 Semestrul	2	2.7 Tipul de evaluare	C	2.8 Regimul disciplinei	DS/DOP

3. Timpul total estimat

3.1 Număr de ore pe săptămână	14	din care: 3.2 curs	2	3.3 seminar / laborator	1
3.4 Total ore din planul de învăţământ	42	din care: 3.5 curs	28	3.6 seminar / laborator	14
Distribuţia fondului de timp					ore
Studiul după manual, suport de curs, bibliografie şi notiţe					8
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren					8
Pregătire seminarii / laboratoare, teme, referate, portofolii şi eseuri					7
Tutoriat					8
Examinări					5
Alte activităţi..................................					0

3.7 Total ore studiu individual	36
3.8 Total ore pe semestru	78
3.9 Numărul de credite	3

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	Fizica,chimie, mecanică, studiul materialelor, rezistență,desen tehnic,bazele fabricației
4.2 de competenţe	Cunoștințe de proiectare asistată de calculator

5. Condiţii (acolo unde este cazul)

5.1. de desfăşurare a cursului	Echipament multimedia
5.2. de desfăşurare a seminarului / laboratorului / proiectului	Retea de calculatoare,soft specific proiectarii ecologice GaBi 4,video-proiector

6. Competenţele specifice acumulate

Competenţe profesionale	C6.1Definirea principiilor, metodelor şi instrumentelor utilizate în planificarea, conducerea şi asigurarea calităţii proceselor de fabricaţie; C6.2 Insuşirea şi aplicarea de metode şi instrumente in scopul optimizării multicriteriale a fabricaţiei, şi a creşterii preciziei de prelucrare; C6.3 Deprinderi în rezolvarea unor aplicaţii specifice domeniului de gestiune a producţiei şi dezvoltarea capacităţilor de proiectare optimă a tehnologiilor de control; C6.4 Dezvoltarea capacităţii de-a utiliza instrumente şi metode de planificare-organizare a producţiei şi pregatire practică în utilizarea instrumentelor calitaţii incluziv utilizarea programelor dedicate acestui scop; C6.5 Elaborarea de proiecte profesionale pe baza utilizării tehnicii de calcul în rezolvarea problemelor de planificare, conducere şi asigurare a calităţii proceselor de fabricaţie.
Competenţe transversale	CT1.Aplicarea valorilor şi eticii profesiei de inginer, şi executarea responsabila a sarcinilor profesionale în condiţii de autonomie restrânsă şi asistenţă calificată. Promovarea raţionamentului logic, convergent şi divergent, a aplicabilităţii practice, a evaluării şi autoevaluării in luarea deciziilor; CT3.Autoevaluarea obiectivă a nevoii de formare profesională continuă în scopul inserţiei pe piaţa muncii şi al adaptării la dinamica cerinţelor acesteia si pentru dezvoltarea personală şi profesională. Utilizarea eficientă a abilităţilor lingvistice şi a cunoştinţelor de tehnologia informaţiei şi a comunicării.

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	Dezvoltarea de competente in domeniul controlului şi protecţiei mediului bazate pe ingineria concurentă, sisteme flexibile de fabricaţie şi fabricaţie inteligentă.
7.2 Obiectivele specifice	Să cunoască structura şi principiile unui sistem de fabricaţie; Să cunoască şi să înţeleagă modalităţile de aplicare a legilor, reglementarilor, standardelor, ghidurilor şi codurilor de practică ecologică relevante; Să poată aplica metode de control inteligent în monitorizarea ecologică; Să utilizeze concepte de flexibilizare şi integrare (Just-In-Time) şi metode de asigurarea calităţii mediului (QFM, FMEA) Să utilizeze proiectarea asistată de calculator pentru proiectarea ecologică a unui SF prin metode generative şi adaptive (sisteme PAC si sisteme expert);

8. Conţinuturi

8.1 Curs	Metode de predare	Observaţii
1.Consideraţii generale privind sistemele de fabricaţie**.** Concepte de baza ale ecologiei.Relatia cu alte stiinte.Legea conservării masei in ecologie. Legea conservarii energiei in ecologie.	Expunere multimedia şi discutii	Studenţii sunt incurajati să puna intrebări
2.Principii si concepte in ecologie.Caracteristicile unui ecosistem. Probleme majore in stiinta mediului.		
3.Dezvoltarea durabilă şi mediu. Economia mediului.		
4. Sisteme de management de mediu. Legislaţie de mediu		
5. Standarde de calitate şi mediu.Auditarea sistemelor de management al calităţii şi al mediului ISO 19011		

6..Instrumente si tehnologii de mediu. Manifestările poluării Substanţe poluante		
7.Tehnologii de depoluare în domeniul apelor, aerului, solului		
8.Tratarea ecologică a deşeurilor.Tehnologii de proces curate.		
9. Biotehnologii		
10Tehnici Fuzzy in controlul și monitorizare proceselor ecologice. Metode, principii si etape in proiectarea sistemelor.		
11.Reţele neurale în controlul și monitorizare proceselor ecologice. Metode, principii si etape in proiectarea sistemelor		
12.Tehnici NeuroFuzzy in controlul și monitorizare proceselor ecologice. Metode. Principii. Etape in proiectarea sistemelor .		
13.Algoritmi genetici in controlul și monitorizare proceselor ecologice.Metode, Principii . Etape in proiectarea sistemelor		
14. Sisteme multiagent in monitorizarea proceselor ecologice. Metode.Principii. Etape în proiectarea sistemelor multiagent în ecologie. Supravegherea şi protecţia ecologică.		

Bibliografie
1. Mohan. Gh., s.a. Ecologia si protecţia mediului-manual preparator. 1993.
2. Paunescu,D.,Rusu,T., Ecologia sistemelor de fabricaţie. Ed. Alma Mater, Cluj-Napoca, 2004
3. Nitu,C.,s.a. Modelarea Proceselor in Ecologie - Editura Printech, Bucuresti, 2000
4. Choucri, N., "Sustainable Development – Theory and Policy", MIT Press, Boston, Massachussetts,USA, 2006;
5. Paunescu,D., Ecologia sistemelor de fabricaţie,Cluj-Napoca, Editura Alma Mater, 2016, ISBN 978-606-504-203-2
6. Standarde:SR EN ISO 9001:2015;SR EN ISO 14001:2015;SR EN ISO 19011:2011

8.2 Seminar / laborator / proiect	Metode de predare	Observaţii
Etapele de programare a unui plan de protecţie a mediului. Simulare numerică pe studiu de caz.	Expunere și aplicații	Studenții sunt întrebați și incurajati să puna intrebări
Modele conceptuale: ecosistem, componente şi corelaţii; sociosistem, componente şi corelaţii		
Sistem multiagent pentru monitorizarea şi conducerea unui proces tehnologic.		
Elemente de protecţie a calităţii aerului. Măsurători de calitate a poluării aerului.		
Elemente de protecţie a calităţii aerului. Măsurători de calitate a poluării aerului.		
Simularea prin tehnici Fuzzy a instalaţiei de tratare a apelor		
Sortarea deşeurilor utilizând reţele neurale. Utilizarea algoritmilor genetici pentru planificarea procesării reziduurilor		

Bibliografie
1. Paunescu,D.,Rusu,T., Ecologia sistemelor de fabricaţie. Ed. Alma Mater, Cluj-Napoca, 2004
2. Paunescu,D., Ecologia sistemelor de fabricaţie,Cluj-Napoca, Editura Alma Mater, 2016, ISBN 978-606-504-203-2.
3. Paunescu,D., Ecologia sistemelor de fabricaţie : aplicaţii. - Cluj-Napoca : Alma Mater, 2014,ISBN 978-606-504-180-6.
Standarde:SR EN ISO 9001:2015;SR EN ISO 14001:2015;SR EN ISO 19011:2011
Programe:
Soft GaBi 4 licenţă PE INTERNATIONAL

9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

Competentele dobândite vor fi necesare inginerilor care-si desfasoara activitatea in cadrul serviciilor de asigurare si control al calitatii, protecției mediului si proiectării tehnologice.

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs	Rezolvarea unui test cu probleme si intrebari din teorie	Proba scrisa – durata evaluarii 1,5 ore (nota T)	60%
	Analiza unui aspect de mediu	Prezentare orala aunui studiu de caz.(nota R)	30%
10.5 Seminar/Laborator	Prezența este obligatorie (100%) Este apreciată activitatea din timpul orelor.	Intrebari din lucrările elaborate de student (nota L)	10%
10.6 Standard minim de performanţă N=T+R+L			
N≥5; T≥5; R≥5; L≥5;			

Data completării:	**Titulari**	**Titlu Prenume NUME**	**Semnătura**
	Curs	Conf.dr.ing. Daniela Păunescu.	
	Aplicații	Conf.dr.ing. Daniela Păunescu.	

Data avizării în Consiliul Departamentului I.F. ________________________	Director Departament I.F. S.l. dr.ing. Adrian Trif
Data aprobării în Consiliul Facultății C.M. ________________________	Decan Prof.dr.ing. Corina Bîrleanu

SYLLABUS

1. Data related to the programme of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of Study	Industrial Engineering
1.5	Study Level	Bachelor of Engineering
1.6	Programme of study/Qualification	Manufacturing Engineering / Engineer (TCM)
1.7	Full or part time (Type of attendance)	IF-Full time attendance
1.8	Subject code	53.30

2. Data related to the subject

2.1	Subject name	Machine for Plastic Deformation										
2.2	Subject area	Manufacturing engineering										
2.3	Course responsible	Prof. PhD. Eng. Grozav Sorin, Sorin.Grozav@tcm.utcluj.ro										
2.4	Seminar/lab classes/project in charge of	SL PhD. Eng. Ceclan Vasile, Vasile.Ceclan@tcm.utcluj.ro										
2.5	Year of study	III	2.6	Semester	2	2.7	Assessment	Coll.	2.8	Subject category	DS/DOP	

3. Total estimated time

3.1	No. of hours per week	3	3.2	of which lecture	2	3.3	Applications	1
3.4	Total no. of hours in the curriculum	42	3.5	of which lecture	28	3.6	Applications	14

Individual study	Hours
Learning from manuals, course notes, bibliography	16
Additional reading and documentation in libraries, electronic platforms and field	6
Preparation of seminars/lab classes, assignments, reports, portfolios, essays	10
Tutorial classes	2
Exams and tests	2
Other activities	-

3.7	Total no. of hours of individual study	36
3.8	Total no. of hours per semester	78
3.9	No. of credit points	3

4. Pre-requisites (where necessary)

4.1	Of curriculum	General knowledge of mechanical, strength of materials, dimensional tolerances and control.
4.2	Of competences	**C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology.

5. Requisites (where necessary)

5.1	To run the courses/lectures	Projector multi-media, blackboard.
5.2	To run the applications	Equipment from the laboratory “Machine of cool deforming”

6 Specific competences

Professional competences	**C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology. **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7 Subject objectives (according to the specific competences)

7.1	General subject objective	Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology.
7.2	Specific objectives	- Choose the type of machine processing depending on the operation to be performed; - Choose materials that run various components of machines by plastic deformation; - To design machinery and equipment for processing by cold plastic deformation.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	General issues concerning the construction of machines for processing by cold pressing. Current stage of development of construction machines and cold pressing tendency of the construction presses. Getting on processing technology and construction by cold pressing dies and molds.	Oral presentation, notes on blackboard and multimedia presentation	Students are encourage d to ask questions Students are encourage d to ask questions
2	Basic conditions for processing by cold pressing. General classification of machines for processing by pressure.		
3	Crank presses.General issues regarding the construction and design of mechanical presses crank.		
4	Mechanisms used to carry the main motion. Mechanical presses with simple action. Establishing functional characteristics of mechanical presses with simple action.		
5	Double acting mechanical presses. Triple action presses. Methods for increasing the number of cycles in double action presses.		
6	Presses with knees. Application range and classification. Simple knee operated presses. Calculate geometric measurements of main movement mechanism. Calculation of forces from the main movement mechanism. Presses with knees with double acting presses. Construction of presses with knees.		
7	Screw presses. Features screw presses working, and the basic parameters of use. Friction presses. Hydraulically driven screw presses. Electrically operated screw presses. Screw presses. Features screw presses working, and the basic parameters of use. Friction presses. Hydraulically driven screw presses. Electrically operated screw presses.		
8.2. Lab classes			
1	Structure and regulation of moulds and dies for presses.	Practical work in the laboratory	Students are asked and encourage d to ask questions
2	Choosing different presses for cold pressing operations.		
3	Working verify the accuracy of cold pressing machines.		
4	Measurement of dies punching force wrench.		
5	Plotting force available ram crank presses.		
6	Structure and mode of control systems and coupling type presses PAI 25 and on PE 6.3.		
7	Energy balance of mechanical presses.		

Bibliography

1. Miler, C., Legg, L., - Achimaş, Gh., Galiş, M., **Grozav, S.**, Grănescu, M.,, Opruţa, D., Popescu, S., Tătaru, O., Vlad,R., *ISO 9000* - ***A Model to Develop Quality Assurance System - Teaching Material***, Editura

Universităţii Centrale din Lanchashire 1997, Preston, England, 427 pag.
2. Tăpălagă ,I., Achimaş, Gh., Iancău H. Tehnologia presării la rece, vol. 1, 2 Litografia IPC-N, 1980, 1985
3. Grozav, S., Tătaru, O., Gagiu, Al., Procedee speciale de prelucrare a metalelor, Editura ROPRINT 1998, Cluj- Napoca, ISBN 973-9298-46-X, 216 pag.
4. Grozav, S., Achimas, Gh., Proiectarea maşinilor unelte pentru prelucrări prin deformare plastică, Îndrumător de lucrari, Editura MEDIAMIRA, 2002, Colecţia Inginerului, ISBN 973-9357-0-6.
5. Grozav, S., Maşini de prelucrare prin deformare plastică, Editura MEDIAMIRA, 2009, Colecţia Inginerului, ISBN 978-973-713-237-6, 233 pag.
6. Grozav, S., Deformarea orbitala, Editura Mediamira, 2009, Colectia Inginerului, ISBN 978-973-713-244-4
7. Grozav, S., Ceclan, V., Popescu, A., Utilaje şi tehnologii pentru prelucrare prin deformare plastică, vol. I Utilaje de prelucrare prin deformare plastică, Editura JRC, 2015, Turda, ISBN 978-606-8009-12-4
8. Tabără, V., Tureac, I., Maşini pentru prelucrări prin deformare la rece, Bucureşti, E.D.P., 1979.
9. Tabără, V., Tureac, I., Maşini pentru prelucrări prin deformare, Bucureşti, Edit. didactică şi pedagogică, 1984.
10. Tureac, I. ş.a. Exploatarea, întreţinerea şi repararea utilajelor de presare la rece. Editura tehnicii, Bucureşti, 1984
11. Grozav, S., Achimaş, Gh., Automatizarea si mecanizarea procedeelor tehnologice de deformare plastica la rece, Editura MEDIAMIRA, 2002, Colectia Inginerului, ISBN 953-9358-91-8, 214 pag.
12. Grozav, S., Maşini de prelucrare prin deformare plastică, Editura MEDIAMIRA, 2009, Colecţia Inginerului, ISBN 978-973-713-237-6, 233 pag.
13. Kuric, I., Grozav, S., s.a., Mechanization and automation equipment for processing, Publish House Alma Mater, Cluj Napoca, 2015, ISBN 978-606-504-188-2, 483 pag.
14. Sorin Grozav, Vasile Ceclan, Adrian Popescu Ivan Kuric, Nadezda Cubonova, Darina Kumicakova, Miroslav Cisar, Vladimir Bulej, Dariusz Wiecek - Equipment for plastic deformation and the automation process, Publish House EDIS, Zilina, Slovacia, 2018, 512 pagini, ISBN 978-606-8009-12-4.

9. Relationship between subject content and expectations of professional community, professional associations and employers in the field of the study programme

Acquired skills will be required that employees and companies operating in the manufacturing profile in the department of engineering construction, the design of technology.

10. Assessment

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weigh in the final mark
Lecture	The ability to answer to theoretical questions	Written test (mark LS) and oral presentation of a specific task (mark RO)	PC=10% LSL=20% LS=50% RO=20%
Applications	Solve practical problems present of the hours. (PC)	Questions on each class(LSL)	
10.4 Minimum performance standard: **N**=PC+LSL+LS+RO			
The final credit can be received only if each of the mark's components is fulfilled: N≥5; LSL≥5; RO≥5; LS≥5			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer	Prof. dr. ing. Grozav Sorin	
	Teachers in charge of application	ŞL. dr. ing. Ceclan Vasile	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina Bîrleanu

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	106.00

2. Data about the subject

2.1	Subject name			Ergonimics			
2.2	Subject area			*Industrial Engineering*			
2.3	Course responsible/lecturer			S.l. dr.ing. Firescu Violeta Maria – violeta.firescu@mis.utcluj.ro			
2.4	Teachers in charge of seminars			S.l. dr.ing. Firescu Violeta Maria – violeta.firescu@mis.utcluj.ro			
2.5 Year of study	3	2.6 Semester	6	2.7 Assessment	C	2.8 Subject category	DC/FAC

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	84	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	18
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	2
Exams and tests	2
Other activities	

3.7	Total hours of individual study	42
3.8	Total hours per semester	84
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	-

5. Requirements (where appropriate)

5.1	For the course	N/A

5.2	For the applications	-

6. Specific competences

Professional competences	C5. Resource management, production quality assurance and organizational development management
Cross competences	TC1. Principles, norms and values of professional ethics responsibly application in professional tasks and the identification of: aims to be achieved, the resources available, work flow, run time, the implementation deadlines and related risks

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Training students in the field of ergonomics. Aim: increasing analytical capacity in the specific area and new skills development.
7.2	Specific objectives	After completing the discipline, students will be able: - to know the principles of ergonomic design for equipment, products, work and work system; - to understand the interactions between work system components; - to summarize work situation parameters to achieve the objectives of ergonomics. - to know the employee requests and the factors affecting work performance, and to evaluate human demands during work; - to understand the contribution that ergonomics can bring to future job - to analyze and evaluate the physical environment: visual, thermal, sound; - to design ergonomic work system components; - to use anthropometric data in design; - to use a specific vocabulary in ergonomics.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
C1. Ergonomics and ergonomic design. Applying ergonomics	There are used: multimedia, interactive teaching style, personal awareness, role play, exercises with preliminary	28 hours
C2. Ergonomics of the physical environment - lighting, microclimate, noise, vibration		
C3. Ergonomic requirements for work on proper posture		
C4. Physical Ergonomics - designing workspace. Criteria and principles of design		
C5. Anthropometry. Using anthropometric data in designing work space		

C6. Physical factors that affect workplace design	and summary for each topic. Students benefit from consultations, 2 hours / week.	
C7. Social factors influencing workplace design		
C8. Product ergonomics. Products design ergonomic principles. Using anthropometric data in product design		
C9. Work systems. Ergonomic design of work systems. Ergonomic production system		
C10. Bio-psycho-social requests in work systems. Integrated work design		
C11. Organizational ergonomics. Specific analysis methods		
C12. EU directive and standardization in ergonomics		
C13. Best practices in ergonomics. Applying ergonomics in companies from the West Europe and Romania		
C14. Ergonomics - support for Lean Management		
Bibliography Firescu V., *Ergonomie*, suport de curs, 2017 Firescu V., Integrated Work Planning, Lambert Academic Publishing, Saarbrücken, Germany, 2016, ISBN 978-3-659-95268-5, (UTCN: cota 550896, 5) Firescu V., Toderici N., Planificarea integrată a muncii: Ergonomie, comunicare şi elemente moderne în managementul muncii, Editura Mega, Cluj-Napoca, 2011, ISBN 978-606-543-144-7, (UTCN: cota 534697, 5) Manolescu A. Lefter V., Deaconu A. (coord.), Ergonomie, Editura Economică, Bucureşti, 2010 (UTCN: cota 530.106, 5) Cărean M., Cărean Al., Principii şi metode ergonomice de proiectare şi analiză, Editura Dacia, Cluj-Napoca, 2001, (UTCN: cota 502.394, 50) Abrudan, I., Candea, D., Cărean M., ş.a., Manual de inginerie economică. Ingineria şi managementul sistemelor de producţie, Editura Dacia, Cluj-Napoca, 2002, (UTCN: cota 510.549, 55)		
8.2. Applications/Seminars	Teaching methods	Notes
L1. Overview of laboratory themes	There are used multimedia, interactive teaching style, realization of measurements of physical environment, case studies and exercises.	14 hours
L2. Photometric measurements and evaluation of visual environment. Measurements and case study		
L3. Measurements of thermal microclimate and thermal environmental assessment. Measurements and case study		
L4. Acoustic measurements and sound environmental assessment. Measurements and case study		
L5. Using anthropometric data in designing workspace. Exercises		
L6. R.N.U.R. method. Case study - I		
L7. R.N.U.R. method. Case study - II		
Firescu V., *Ergonomie*, suport de laborator, 2017 Cărean M., *Ergonomie : îndrumător pentru lucrări de laborator și diplomă*, Editura UTPress, Cluj-Napoca, 1999, (UTCN: cota 494.292, 35)		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

ARACIS has reviewed and has approved the course content.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Activity at courses (participate in discussions, tests)	tests, checklists	10%
10.5 Applications	Activity at laboratory (laboratory exercises and assignments)	portofolio	30%
10.6 Minimum standard of performance			
N=0,6 E+0,3 A+0,1 C; Written Exam (E, multiple choice and open questions); Activity at applications (A); Activity at courses (C). E≥5; A≥5			

Date of filling in: 10.12.2018		Title Surname Name	Signature
	Lecturer	Assist. Prof. PhD Eng. Violeta FIRESCU	
	Teachers in charge of application	Assist. Prof. PhD Eng. Violeta FIRESCU	

Date of approval in the department …….. _________________________	Head of department Prof.dr.ing.
Date of approval in the faculty …………… _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	Universitatea Tehnică din Cluj-Napoca
1.2 Facultatea	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Ingineria Fabricaţiei
1.4 Domeniul de studii	Inginerie Industrială
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii / Calificarea	Tehnologia Construcţiilor de Maşini (în limba engleza)/Inginer
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	204.00

2. Date despre disciplină

2.1 Denumirea disciplinei	**Instruire asistată de calculator**						
2.2 Aria de conţinut	(se completează din grila 2 atasata: arii de conţinut)						
2.3 Responsabil de curs	Prof. Dr. Ing. Carmen BAL – carmen.bal@dppd.utcluj.ro						
2.4 Titularul activităţilor de seminar /	Prof. Dr. Ing. Carmen BAL – carmen.bal@dppd.utcluj.ro						
2.5 Anul de studiu	3	2.6 Semestrul	6	2.7 Tipul de evaluare	E	2.8 Regimul disciplinei	DC/FAC

3. Timpul total estimat (ore pe semestru al activităţilor didactice)

3.1 Număr de ore pe săptămână	2	din care: 3.2 curs	1	3.3 seminar / laborator	1
3.4 Total ore din planul de învăţământ	28	din care: 3.5 curs	14	3.6 seminar / laborator	14

Distribuţia fondului de timp	ore
Studiul după manual, suport de curs, bibliografie şi notiţe	
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren	
Pregătire seminarii / laboratoare, teme, referate, portofolii şi eseuri	24
Tutoriat	
Examinări	
Alte activităţi..................................	

3.7 Total ore studiu individual	24
3.8 Total ore pe semestru	52
3.9 Numărul de credite	2

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	• Instruire asistată de calculator
4.2 de competenţe	•

5. Condiţii (acolo unde este cazul)

5.1. de desfăşurare a cursului	• Sala de curs, videoproiector,
5.2. de desfăşurare a seminarului / laboratorului / proiectului	• Prezenţa la seminar este obligatorie

6. Competenţele specifice acumulate

Competenţe profesionale	C1. Operarea cu metodelor şi procedeelor utilizate în predarea disciplinelor tehnice, a instrumentelor de predare-învăţare şi a instrumentelor de evaluare utilizând în procesul educaţional calculatorul. - C1.1. Însuşirea noţiunilor de specialitate necesare utilizării calculatorului în procesul de informare şi formare în învăţământul preuniversitar, a contextului psihopedagogic şi metodic aferent; - Operarea cu noţiunile şi metodele specifice instruirii asistate de calculator, proiectării şi dezvoltării curriculare; - Utilizarea şi evidenţierea unor tehnici didactice de predare – învăţare - evaluare prin intermediul calculatorului; C2. Formarea unei orientări moderne, dinamice şi prospective asupra problematicii cursului.
Competenţe transversale	• CT3 - Autoevaluarea obiectivă şi diagnoza nevoii de formare profesională continuă în scopul inserţiei pe piaţa muncii şi al adaptării la dinamica cerinţelor acesteia şi pentru dezvoltarea personală şi profesională. Autocontrolul învăţării şi utilizarea eficientă a cunoştinţelor de calculator, dezvoltă o buna gestionare a activităţilor personale, precum şi cea de comunicare.

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	• Însuşirea de către studenţi a conceptelor de bază de proiectare didactică a metodelor şi strategiilor de predare învăţare - evaluare, a tehnicilor de formare a echipelor de lucru, planificare a timpului şi întocmirea documentaţiei didactice necesare în procesul de predare – învăţare – evaluare utilizînd calculatorul ca instrument didactic.
7.2 Obiectivele specifice	• Formarea competenţelor de organizare, proiectare şi evaluare a activităţilor didactice la disciplinele tehnice utilizând calculatorul. • Utilizarea adecvată a conceptelor reformei curiculare. • Formarea competenţelor de proiectare curriculară în domeniul disciplinelor tehnice utilizarea calculatorului şi a softurilor educationale. • Cunoaşterea metodelor de învăţământ utilizate la predarea disciplinelor tehnice. • Cunoaşterea formelor de organizare a activităţii elevilor. • Formarea competenţelor de evaluare la disciplinelor tehnice prin

	utilizarea softurilor educationale.

8. Conţinuturi

8.1 Curs	Metode de predare	Observaţii
1. Noţiuni generale de IAC. Definiţia interacţiunii elev-computer	Expunerea dialogul, problematizarea.	
2. Modalităţi de utilizare a calculatorului în procesul de predare învăţare. 3. Programe de instruire asistată pe calculator. Softul educaţional	Exemplificare, dialog , comunicarea euristică	
4. Noţiuni de didactică informatică;	Comunicare euristică, problematizarea, dialogul	
5. Formarea elevilor/studenţilor prin IAC;	Comunicare euristică, problematizarea, dialogul,	
6. TIC ansamblul resurselor de difuzare, stocare şi gestionare a informaţiei destinată procesului educativ.	Comunicare euristică, problematizare, studiu de caz,	
7. Educaţia la distanţă noţiuni de e-learning	Studiu de caz, realizarea unui mini proiect de lecţie.	

Bibliografie
1. Adăscăliţei, Adrian (2007) : Instruire asistată de calculator. Didactică informatică, Ed. Polirom, Iaşi.
2. Carmen Bal, Instruire Asistata de Calculator, de la teorie la practică, Editura ALMA MATER, 2009, ISBN978-606-504-066-3.
3. Bârză, Silviu (2002) : Bazele informaticii şi noţiuni de birotică. Ed. Fundaţiei României de mâine, Bucureşti.
4. Creţu, Carmen (1999) : Teoria curriculum-ului şi conţinuturile educaţiei, Ed. Univ. „Al. I. Cuza", Iaşi.
5. Cucoş, Constantin (1999) : Pedagogie, Polirom, Iaşi.
6. Damian, Alexandru-Miron (2000-2001) : Teoria şi metodologia instruirii, Ed. Fundaţiei „România de Mâine", Bucureşti.
7. Ionescu, C. (1998) : Metodica predării informaticii, Univ. Babeş-Bolyai, Cluj.

8.2 Seminar / laborator / proiect	Metode de predare	Observaţii
1. Elaborarea unui program de instruire	Lucrul pe grupe de 4, cu materiale didactice,	
2. Aspecte specifice ale proiectării activităţilor didactice. 3. Proiectarea unei lecţii de specialitate cu ajutorul calculatorului sau cu ajutorul unui soft educaţional..	Lucrul pe echipe şi realizarea de proiecte de lecţie pe calculator.	
4. Comparaţie între două metode în predarea a aceluiaşi conţinut 5. Simularea predării unei lecţii de specialitate cu ajutorul unui soft educaţional (AEL)	Întocmirea de documente didactice şi realizarea de proiecte de lecţie pe calculator.	
6. Aplicaţie. Elaborarea unui proiect de lecţie cu ajutorul computerului.	Realizarea diferitelor proiecte de lecţie	
7. Evaluarea prin intermediul calculatorului	Întocmirea unui portofoliu didactic.	

Bibliografie
1. Adăscăliţei, Adrian (2007) : Instruire asistată de calculator. Didactică informatică, Ed. Polirom, Iaşi.
2. Carmen Bal, (2009), Instruire Asistata de Calculator, de la teorie la practică, Editura ALMA MATER, , ISBN978-606-504-066-3.
3. Bârză, Silviu (2002) : Bazele informaticii şi noţiuni de birotică. Ed. Fundaţiei României de mâine, Bucureşti.
4. Creţu, Carmen (1999) : Teoria curriculum-ului şi conţinuturile educaţiei, Ed. Univ. „Al. I. Cuza", Iaşi.
5. Cucoş, Constantin (1999) : Pedagogie, Polirom, Iaşi.
6. Damian, Alexandru-Miron (2000-2001) : Teoria şi metodologia instruirii, Ed. Fundaţiei „România de Mâine", Bucureşti.
7. Ionescu, C. (1998) : Metodica predării informaticii, Univ. Babeş-Bolyai, Cluj

9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

- Disciplina este una fundamentală în cadrul modului de psihopedagogie şi transmite studenţilor noţiuni menite să le dezvolte abilităţile de proiectare didactică, utilizarea eficientă a metodelor şi strategiilor de predare - învăţare – evaluare cu ajutorul calculatorului.

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs			
10.5 Seminar/Laborator	• activitate la seminar – 20%; • portofoliu (elaborare proiecte didactice şi teste de evaluare) – 40%; • examinare finală – 40%.		50% din punctajul evaluarii finale + 50% din punctajul evaluarii finale.
10.6 Standard minim de performanţă			
• predarea proiectului de lectie; • predarea unui set de probe de evaluare; obţinerea a 50 % din punctajul verificării finale.			

Data completării:	Titulari	Titlu Prenume NUME	Semnătura
	Curs	Prof. Dr. Ing. Carmen BAL	
	Aplicaţii	Prof. Dr. Ing. Carmen BAL	

DEPARTAMENTUL DE SPECIALITATE CU PROFIL PSIHOPEDAGOGIC

Data avizării în Consiliul Departamentului IF ______________________	Director Departament IF Sl.dr.ing. Adrian TRIF
Data aprobării în Consiliul Facultății CM ______________________	Decan Prof.dr.ing. Corina BÎRLEANU

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	Universitatea Tehnică din Cluj-Napoca
1.2 Facultatea	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Ingineria Fabricaţiei
1.4 Domeniul de studii	Inginerie Industrială
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii / Calificarea	Tehnologia Construcţiilor de Maşini (în limba engleza)/Inginer
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	205.00

2. Date despre disciplină

2.1 Denumirea disciplinei	**Practica pedagogica I**						
2.2 Aria de conţinut	(se completează din grila 2 atasata: arii de conţinut)						
2.3 Responsabil de curs	Prof. Dr. Ing. Carmen BAL – carmen.bal@dppd.utcluj.ro						
2.4 Titularul activităţilor de seminar	Prof. Dr. Ing. Carmen BAL – carmen.bal@dppd.utcluj.ro						
2.5 Anul de studiu	3	2.6 Semestrul	5,6	2.7 Tipul de evaluare	Colocviu	2.8 Regimul disciplinei	DC/FAC

3. Timpul total estimat (ore pe semestru al activităţilor didactice)

3.1 Număr de ore pe săptămână	3	din care: 3.2 curs		3.3 seminar / laborator	3
3.4 Total ore din planul de învăţământ	42	din care: 3.5 curs		3.6 seminar / laborator	42

Distribuţia fondului de timp	ore
Studiul după manual, suport de curs, bibliografie şi notiţe	
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren	20
Pregătire seminarii / laboratoare, teme, referate, portofolii şi eseuri	10
Tutoriat	
Examinări	3
Alte activităţi..................................	3

3.7 Total ore studiu individual	36
3.8 Total ore pe semestru	78
3.9 Numărul de credite	3

4. Precondiţii (acolo unde este cazul)

4.1 de curriculum	• Cunostinte de bază în ştiintele educaţiei, dobîndite pe parcursul studiilor de modul psihopedagogic, prin experienţă profesională sau si in contexte4 nonformale msau informale de invăţare.
4.2 de competenţe	• Competenţe de operare pe calculator (Word, Excel, Power Point şi Internet Explorer)

5. Condiţii (acolo unde este cazul)

5.1. de desfăşurare a cursului	• Participare activă;

	• Lectura suportului de curs
5.2. de desfăşurare a seminarului / laboratorului / proiectului	• Lectura bibliografiei recomandate; • Elaborarea şi sustinerrea lucrarilor planificate şi asamblarea acestora într-un portofoliu de evaluare; • Participare active.

6. Competenţele specifice accumulate

Competenţe profesionale	C1 Utilizarea, interpretarea , prelucrarea şi aplicarea cunoştinţelor de specialitate psihopedagogice şi metodologice în cadrl întregului demers didcatic de proiectare a activităţilor instructiv-educative şi a materialelor didactice; C2 Identificarea şi apliocarea principiilor şi strategiilor didactice în proiectarea activităţilor instructiv educative specifice nivelului de vârstă al clasei cuc are lucrează; C3. Elaborarea modelelor de proiectare a activităţilor instructiv educative şi /sau extracurriculare.
Competenţe transversale	• CT1 – Aplicarea principiilor şi a nhormelor de deontologie profesională fundamentale pe opţiuni valorice explicite, specifice specialistului în ştiinţele educaţiei. • CT2 – Cooperarea eficientă în echipe de lucru profesionale, interdisciplinare, specifice dersfăşurării proiectelor şi programelor educaţionale; • CT3Utilizarea metodelor şi tehn icilor eficiente de învăţare pe tot parcursul vieţiiîn vederea formării şi dezvoltării profesionale; • CT3 – Prtomovarea v alorilor unui învăţământ de calitate, în conformitate cu politicile educaţionaleinterne şi în acord cu cele elaborate şi popularizate la nivel european.

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	Cunoaşterea specificului cercetării procesului de învăţământ (caracterisitici, etape, funcţii, tipuri, metodologii etc.) din pertspectiva practiocii pedagogice desfăşurate în cadrul învăţământului preuniversitar).
7.2 Obiectivele specifice	• Dezvoltarea capacităţii de observare, consemnare, analiză şi apreciere a activităţilor instructiv-educsative; • Formarea unuzi sistem de capacităţi operţaţionale de a proiecta, realiza şi evalua activităţile instructiv-educative: capacitatea de a proiecta activităţi inegral, de diferite tipuri şi variante, precum şi alte forme de organizare a procesului de învăţământ; capacitatea de a conduce integral activităţi de tipuri/variante diferite; capacitatea de a măsura, aprecia, decide cu privire la desfăşurarea unor activităţi, capacitatea de a regla/autoregla activităţile în funcţie de rezultatele evaluării; • Dezvoltarea capacităţii de a colabora cu diferiţi factori educativi, antrenându-i în activităţile instructiv-educative.

8. Conţinuturi

8.1 Curs	Metode de predare	Observaţii
8.2 Seminar / laborator / proiect	Metode de predare	Observaţii
1. Observarea şi înregtistrarea integraslă a diferitellor	Practică observativă	

tipuri/variante de lecţii, cu ajutorul unor instrumente şcolare (grile, fişe, ghiduri, etc.).	Practică efectivă Dezbarea în grup.	
2. Analiza, dezbaterea şi aprecierea în grup a lecţiilor observate, cel puţin 3-4 variante de lecţii pentru fiecarte tip categorie de lecţie şi 1-2 forme de activitate.	Practică observativă Practică efectivă Dezbarea în grup	
3. Elaborarea proiectului unor unităţi de învăţare şi a unor lecţii de tipuri şi variante diferite, precum şi a altor forme de organizare a procesujlui de învăţământ.	Practică observativă Practică efectivă Dezbarea în grup	
4. Conducerea integrală a unor lecţii de tipuri şi variante diferite, precum şi a altor forme de organizare a procesujlui de învăţământ, conform planificării rea lizate de coordonatorul şi mentorul de proactică pedagogică.	Practică observativă Practică efectivă Dezbarea în grup	
5. Utilizarea unor instrumente de evaluare (autoevaluarea) lecţiei/sistemelor de lecţii şi a altor forme de organizare a procesului de învăţământ; măsurarea şi aprecierea realizării unor obiective şi a lecţiei integral.	Practică observativă Practică efectivă Dezbarea în grup. Practică observativă Practică efectivă Dezbarea în grup. Practică observativă Practică efectivă Dezbarea în grup Practică observativă Practică efectivă Dezbarea în grup.	
6. Exerciţii de elaborare a unor alternative de lecţii, integral sau pe secvenţe, în funcţie de rezultatele evaluării.		
7. Exersarea unor atitudini pozitive faţă de elevi şi profesie şi a unor atitudini creative în desfăşurarea activităţilor instructiv-educative.		
8. Aplicarea creatoare, la specificul situaiei, a principalelor tehnici de învăţare eficientă – stilul activităţilor intelectuale. Aplicarea unor metode şi procedee de prevenire şi comb atere a rămânerii în urmă la învăţătura a unor elevii		
9. Aplicarea unor strategii de identificare şi dezvoltare a înclinaţiilor şi aptitudinilor elevilor, părin individualizarea activităţilor de învăţare în scopul dezvoltării performanţelor maxime..		
10. Aplicarea unor strategii caracteristice pentru dezvoltarea cooperării/comunicării şi dezvoltării unor relaţii psihosociale pozitiver /simulativeâ, a unor motive superioare de apartenenţă de grup, de afiliere, de dezvoltare a grupului ca entitate etc.	Practică observativă Practică efectivă Dezbarea în grup Practică observativă Practică efectivă Dezbarea în grup	
11. Recunoaşterea (identificarea) caracterisiticilor unei cercetări, a etapelor, funcţiilor etc. Prin analiza unei cercetări empăirice desfăşurate la nivelul unităţii şcolare, prin discuţie de grup.		
12. Aplicarea în cadrul unui proiect de cercetare a metodelor principale de cercetare: dezbaterea, argumentarea observarea, experimentul, ancheta, etc.	Practică observativă Practică efectivă Dezbarea în grup	
13. Utilizarea tehnicilor de negociere argumentare, contraargumentare, de prognoză, de raţionare şi exprimare, de persuasiune.	Practică observativă Practică efectivă Dezbarea în grup	
14. Activităţi practice de sfătuire a elevilor pentru a valorifica plenar valenţele timpului liber pentru recreere şi autodezvoltare.	Practică observativă Practică efectivă Dezbarea în grup	

Bibliografie

1. Curriculum-ul pentru invăţământul preuniveristare tehnic (plan de invăţământ, programe scolare pentru clasele V-VII, IX- XII), ghiduri, îndrumătoare, manuale de specialitate etc.
2. Carmen Bal, Noţiuni de didactica specialităţii tehnice, Editura UTPRES Cluj Napoca, 2007;

9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

• Conţinuturile disciplinei acoperă un segment foarte important al formării profesionalela nivel de licenţă fiind în acord cu aşteptările comunităţii specialiţştilor în domenikul tehnic şi în cel al angajatorilor din domeniul educaţional tehnic.

10. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs			
10.5 Seminar/Laborator	Practică observativă; Practică efectorie.	Portofoliu de practică pedagogică	100
10.6 Standard minim de performanţă			
70% rezultat după însumarea puntajelor ponderate conform pct 10.3			

Data completării:	Titulari	Titlu Prenume NUME	Semnătura
zz.ll.aaaa	Curs		
	Aplicații	Prof. Dr. Ing. Carmen BAL	

Data avizării în Consiliul Departamentului IF ______________________	Director Departament IF Sl.dr.ing. Adrian TRIF
Data aprobării în Consiliul Facultății CM ______________________	Decan Prof.dr.ing. Corina BÎRLEANU

FIŞA DISCIPLINEI

1. Date despre program

1.1 Instituţia de învăţământ superior	Universitatea Tehnică din Cluj-Napoca
1.2 Facultatea	Faculty of Industrial Engineering, Robotics and Production Management
1.3 Departamentul	Ingineria Fabricaţiei
1.4 Domeniul de studii	Inginerie Industrială
1.5 Ciclul de studii	Licenţă
1.6 Programul de studii / Calificarea	Tehnologia Construcţiilor de Maşini (în limba engleza)/Inginer
1.7 Forma de învăţământ	IF – învăţământ cu frecvenţă
1.8 Codul disciplinei	206.00

2. Date despre disciplină

2.1 Denumirea disciplinei			**Managementul clasei de elevi**				
2.2 Titularul activităţilor de curs			Prof dr. Ing Bal Carmen				
2.3 Titularul activităţilor de seminar			Prof dr. Ing Bal Carmen				
2.4 Anul de studiu	**III**	2.5 Semestrul	**6**	2.6. Tipul de evaluare	**E**	2.7 Regimul disciplinei	DC/FAC

3. Timpul total estimat (ore pe semestru al activităţilor didactice)

3.1 Număr de ore pe săptămână	2	din care 3.2 curs	1	din care 3.3 seminar/laborator	1
3.4 Total ore din Planul de învăţământ	28	din care 3.5 curs	14	din care 3.6 seminar/laborator	14
Distribuţia fondului de timp					ore
Studiul după manual, suport de curs, bibliografie şi notiţe					20
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate şi pe teren					10
Pregătire seminarii/laboratoare, teme, referate, portofolii şi eseuri					16
Tutoriat					2
Examinări					2
Alte activităţi....					0

3.7 Total ore studiu individual	50
3.8 Total ore pe semestru	78
3.9 Numărul de credite	**3**

2. Precondiţii (acolo unde este cazul)

4.1 de curriculum	•
4.2 de competenţe	•

5. Condiţii (acolo unde este cazul)

5.1 de desfăşurare a cursului	• Participare activă
5.2 de desfăşurare a seminarului/laboratorului	• Lectura bibbliografiei recomandate • Documentare suplimentară • Elaborarea şi susţinerea prezentărilor planificate

6. Competenţe specifice acumulate

Competenţe profesionale	C1: Proiectarea unor programe de instruire sau educaţionale adaptate pentru diverse niveluri de vârstă/pregătire şi diverse grupuri ţintă; C4 Abordarea managerială a grupului de şcolari, a procesului de învăţământ şi a activităţilor de învăţare/integrare socială specifice vârstei grupului ţintă C6 .Autoevaluarea şi ameliorarea continuă a practicilor profesionale şi a evoluţiei în carieră
Competenţe transversale	CT2 Cooperarea eficienta în echipe de lucru profesionale, interdisciplinare, specifice desfasurarii proiectelor si programelor din domeniul stiintelor educatiei; CT4: Promovarea valorilor asociate realizării unui învăţământ de calitate, în conformitate cu politicile educaţionale interne şi în acord cu cele elaborate şi popularizate la nivel european, pe baza cunoaşterii specificităţii domeniului educaţional european şi a interculturalităţii; CT6 Aplicarea principiilor si a normelor de deontologie profesionala, fundamentate pe optiuni valorice explicite, specifice specialistului în stiintele educatiei;

7. Obiectivele disciplinei (reieşind din grila competenţelor specifice acumulate)

7.1 Obiectivul general al disciplinei	• Să aplice tehnici eficiente de management al clasei de elevi, în cadrul diferitelor componente ale managementului clasei de elevi;
7.2 Obiectivele specifice	• Să stabilească specificitatea abordării manageriale în procesul de învățământ; • Să analizeze componentele managementului clasei de elevi; • Să opereze cu conceptele specifice domeniului; • Să identifice situațiile de criză educațională încă din faza incipientă, ordonându-le şi clasificându-le în funcţie de specificitatea acestora; • Să determine soluţiile pertinente pentru diferitele situaţii de criză educaţională; • Să-şi perfecţioneze stilul managerial propriu.

8. Conţinuturi

Curs	Metode de predare	Observaţii
1. Obiectul şi problematica managementului clasei de elevei. Conceptele de management general, educaţional, organizaţional – definire şi prezentare comparativă;	Curs interactiv: - expunerea; - prelegerea intensificată; - explicaţia; - conversaţia euristică; -problematizarea;	
2. Caracteristicile generale ale conducerii în sistemul de învăţământ. Principiile şi funcţiile managementului educaţional;		
3. Stiluri manageriale ale cadrelor didactice şi climatul şcolii;		

	- dezbaterea; - Jigsaw.	
4. Clasa ca grup social. Relaţiile educaţionale; 5. Utilitatea cunoaşterii clasei ca grup social; 6. Managementul activităţilor didactice 7. Managementul conflictului în clasa de elevi.	Curs interactiv: - expunerea; - prelegerea intensificată; - explicaţia; - conversaţia euristică; -problematizarea; - dezbaterea; - Jigsaw.	
8.2 Seminar/laborator	**Metode de predare**	**Observaţii**
1. Aspecte introductive: prezentarea obiectivelor disciplinei şi a competenţelor vizate, bibliografia, precizarea sarcinilor de seminar, distribuirea temelor şi referatelor 2. Comunicarea la nivelul clasei: tipuri de comunicare, scheme de comunicare. Aplicaţii; 3. Metode şi tehnici de cunoaştere a grupului şcolar: observaţia ştiinţifică 4. Tehnica sociometrică, profilul psihosocial al grupului, autobiografia grupului 5. Fişa de caracterizare psihosocială a clasei 6. Managementul conflictului: studii de caz; 7. Negocierea: tehnici de negociere – joc de rol.	- exerciţiul; - studiul de caz; - eseul; - problematiza-rea; - dezbaterea; - jocul de rol	

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2. Ciot Gabriela Melania – Managementul clasei de elevii, UTPRESS Cluj Napoca, 2006.
3. Ciascai, Liliana – *Managementul clasei de elevi. De la teorie la practică,* Ed. Casa Cărţii de Ştiinţă, Cluj-Napoca, 2007
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5. Iucu, Romiţă B. – *Managementul clasei de elevi*, Polirom, Iaşi, 2006.
6. Lemeni, Gabriela., Miclea, Mircea - *Consiliere și orientare*, Ed. ASCR, Cluj-Napoca, 2004
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educaţională, Editura Polirom, Iaşi, 2006;
19 Joiţa, E., Management educaţional : Profesorul-manager. Rolurişi metodologie, Editura Polirom, Iaşi, 2000
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*** Management educational (2003), Institutul romîn de management educaţional, Ed. CDRMO, Iasi, vol.II;
*** Principals for our Changing Schools, Knowledge and Skill Base,(1993)National Policy Board for Educationa Administration A&M, Texas, University Of Utah, Bowling Green University, Ohio
*** http://www.intime.uni.edu/model/Romanian_Model/teacher/covenant.html.

9. Coroborarea conţinuturilor disciplinei cu aşteptările reprezentanţilor comunităţii epistemice, asociaţiilor profesionale şi angajatorilor reprezentativi din domeniul aferent programului

- Competenţele dobândite la absolvirea acestui curs permit absolventului, indiferent de specializare, o gestionare mai eficientă a vieţii personale şi profesionale, respectiv o inserţie productivă pe piaţa forţei de muncă (prin cunoştinţele şi competenţele privind: managementul stresului, al timpului, cunoaşterea posibilităţilor personale şi profesionale reale, autodepăşire şi motivare, comunicare eficientă ş.a.).

10. Evaluare

Tip de activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs	Volumul şi corectitudinea cunoştinţelor	Lucrare scrisă	40
	Rigoarea ştiinţifică a limbajului	Lucrare scrisă	10
	Organizarea conţinutului	Lucrare scrisă	10
	Originalitatea	Lucrare scrisă	10
10.5 Seminar/laborator	Susţinerea unui referat	Fişă de evaluare seminar	20
	Participare activă la seminarii	Fişă de evaluare seminar	10
10.6 Standard minim de performanţă			
• 50% rezultat după însumarea punctajelor ponderate conform pct.10.3.			

DEPARTAMENTUL DE SPECIALITATE CU PROFIL PSIHOPEDAGOGIC

Data completării:	Titulari	Titlu Prenume NUME	Semnătura
zz.ll.aaaa	Curs	Prof dr. Ing Bal Carmen	
	Aplicații	Prof dr. Ing Bal Carmen	

Data avizării în Consiliul Departamentului IF ________________________	Director Departament IF Sl.dr.ing. Adrian TRIF
Data aprobării în Consiliul Facultății CM ________________________	Decan Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	54.00

2. Data about the subject

2.1	Subject name	Cutting Processing Technologies II					
2.2	Subject area	Manufacturing engineering					
2.3	Course responsible/lecturer	Lecturer PhD. Eng. Ioan Alexandru POPAN, Ioan.popan@tcm.utcluj.ro					
2.4	Teachers in charge of seminars	Lecturer PhD. Eng. Ioan Alexandru POPAN, Ioan.popan@tcm.utcluj.ro					
2.5 Year of study	IV	2.6 Semester	1	2.7 Assessment	Exam	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	5	3.2 of which, course:	3	3.3 applications:	2
3.4 Total hours in the curriculum	70	3.5 of which, course:	42	3.6 applications:	28

Individual study	hours
Manual, lecture material and notes, bibliography	17
Supplementary study in the library, online and in the field	14
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	16
Exams and tests	3
Other activities	

3.7	Total hours of individual study	60
3.8	Total hours per semester	130
3.9	Number of credit points	5

4. Pre-requisites

4.1	Curriculum	Descriptive Geometry and Technical Drawing, Materials, Machine Tools, Cutting Tools
4.2	Competence	Specific professional development of industrial engineering projects-based selection, combination and use of knowledge, principles and methods

5. Requirements

5.1	For the course	Projector multi-media, blackboard
5.2	For the applications	Equipment from the laboratory “Cutting Processing Technologies”

6. Specific competences

Professional competences	**C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology. **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. **C4.3.** Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. **C4.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. **C4.5.** Elaborating professional projects for manufacturing technological processes specific for manufacturing technologies, including specific CAM programs **C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives

7.1	General objective	Developing skills in the field of cutting processing technologies on conventional and CNC machine tools.
7.2	Specific objectives	1. Gaining the theoretical and practical knowledge about cutting processing technologies, using different manufacturing equipment. 2. Learning how to create an optimal cutting operation sequence.

8. Contents

8.1. Lecture	Teaching methods	Notes

1. Introduction on cutting processes.	Oral presentation, notes on blackboard and multimedia presentation	Students are encouraged to ask questions
2. Design of cutting processes and operations sequences selection. Case study.		
3. Turning processes. Types of turning operations. Tooling.		
4. External and face turning.		
5. Profile turning.		
6. Grooving and parting-off turning.		
7. Thread turning.		
8. Internal turning.		
9. Milling processes. Types of turning operations. Tooling.		
10. Face milling. Peripherical milling.		
11. Slots and pockets milling. Thread milling.		
12. Drilling, Tapping, Reaming, Boring, Face Milling, Shaping and Broaching processes.		
13. Grinding processes. Cylindrical and surface grinding.		
14. Thread grinding. Super-finishing machining processes. Honing.		

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1. Ancău, M., Tehnologia Fabricaţiei, Editura Casa Cartii de Stiinţă, Cluj-Napoca, 2003.
2. Bâlc, N., Gyenge, Cs., Berce, P., Proiectare pentru fabricaţia competitivă, Editura Alma Mater, Cluj-Napoca 2006.
3. Cărean, Al., Tehnologii de prelucrare cu CNC, Editura Dacia, Cluj–Napoca, 2002.
4.Alexandru CĂREAN si Ioan Alexandru POPAN, “Programarea şi operarea centrelor de prelucrare CNC”, ISBN 978-606-737-102-4, Editura U.T.PRESS, Cluj-Napoca, 2015
5. Damian, M., Cărean, Al., s. a., Fabricaţie asistată de calculator, Cluj-Napoca, Casa Cărţii de Ştiinţă, 2003.
6. Gyenge, Cs., Fratila, D. Ingineria fabricatiei, Editura Alma Mater, Cluj-Napoca, 2004.
7. Gyenge, Cs., Ros, R. şi Popa, M., Tehnologia fabricării maşinilor unelte. Editura UT.Cluj, 1990.

8.2. Applications/Seminars	Teaching methods	Notes
1. Content presentation. Safety rules for work in the laboratory.	Oral presentation, manufacturing the parts: „Furca”, “Arbore” and “Riglă de ghidare”.	
2. The case study “furca” presentation.		
3. Drawing interpretation and the analysis of manufacturing possibilities of the part “furca”.		
4. Process planning (process selection, workpiece selection; machine tool selection and operation selection.)		
5. Tools and clamping systems selection for turning operations.		
6. Machining parameters selection and machining time calculation for turning operations.		
7. Manufacturing the part „Furca” using the conventional turning machine (SNA 500).		
8. Tools and clamping systems selection for milling operations.		
9. Machining parameters selection and machining time calculation for milling operations.		
10. Manufacturing the part „Furca” using the conventional milling machine (FUS 22).		
11. Manufacturing the part „Furca” using CNC equipment (turning machine LYNX 220 and milling machine HAAS VF-2SS.)		
12. Cylindrical grinding, case study: machining the part		

“Arbore”.		
13. Surface grinding, case study: machining the part “Riglă de ghidare”.		
14. Final conclusions.		

Bibliography

1. Catalogue SANDVIK
2. Catalogue GHURING
3. Ancău M., Tehnologia Fabricaţiei, Editura Casa Cartii de Stiinţă, Cluj-Napoca, 2003.
4. Cărean, Al. si Popan, A., Programarea si operarea centrelor de prelucrare CNC, Editura U.T. Press, 2015

5. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The professional skills in the conventional and CNC cutting processing technologies field, gained during the course, are in line with the employer’s expectations

6. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The ability to answer to theoretical questions and to solve practical problems	Written test (mark T)	T is 75%
10.5 Applications	The presence is compulsory (100%). The activity during classes is appreciated	Questions on each class (mark A)	A is 25%
10.6 Minimum standard of performance N =T + A			
The final credit can be received only if each of the mark’s components is fulfilled: N≥5; T≥5; A≥5			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Lecturer PhD. Eng. Ioan Alexandru POPAN	
	Teachers in charge of application	Lecturer PhD. Eng. Ioan Alexandru POPAN	

Date of approval in the department IF _________________________	Head of department Lecturer PhD. Eng. Adrian TRIF
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*55.00*

2. Data about the subject

2.1	Subject name			Metal Forming Technologies			
2.2	Subject area			*Manufacturing Engineering*			
2.3	Course responsible/lecturer			*Prof. PhD. Eng. Dorel Banabic – banabic@tcm.utcluj.ro*			
2.4	Teachers in charge of seminars			*Assoc.prof. PhD. Eng. Lucian Lăzărescu – llucian@tcm.utcluj.ro*			
2.5 Year of study	4	2.6 Semester	1	2.7 Assessment	E	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	5	3.2 of which, course:	2	3.3 applications:	3
3.4 Total hours in the curriculum	70	3.5 of which, course:	28	3.6 applications:	42
Individual study					hours
Manual, lecture material and notes, bibliography					28
Supplementary study in the library, online and in the field					14
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					14
Tutoring					2
Exams and tests					2
Other activities					

3.7	Total hours of individual study	60
3.8	Total hours per semester	130
3.9	Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

6. **Specific competences**

Professional competences	By studying this discipline the students will get the following professional skills: - Knowledge of the cold metal forming technologies - Knowledge of the methods used for calculating the technological parameters of the metal forming processes - Knowledge of the technological design principles specific to metal forming procedures - Knowledge of the principles specific to the design of metal forming tools - Knowledge of the most representative metal forming machines - Design of a cold metal forming technological process and design of a simple cold metal forming die - Simulation of a metal forming process with the help of a commercial finite element code (AUTOFORM, Dynaform) - Analysis and interpretation of the data obtained by numerical simulation - Use of a commercial finite element code (AUTOFORM, Dynaform) - Use of a modern equipment for analyzing the formability (Erichsen system) - Use of a mechanical/hydraulic press.
Cross competences	- autonomy and responsibility - personal and professional development - team work capability - oral and written comunication capabilities - reasoning/argumentation and critical thinking capabilities - solving problems and making decisions - capability of operating in a multidisciplinary manner by using methodologies and concepts that belong to exact s.

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	Getting knowledge of the most representative cold metal forming technologies
7.2	Specific objectives	- Technological design of metal forming processes - Numerical simulation of metal forming processes - Design of metal forming equipment.

8. **Contents**

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Cold metal forming technologies General presentation. Classification. Terminology	Multimedia facilities are used during the course activities in order to: • Describe the	Computer, Video-projector
2. Shearing procedures Analysis of the shearing process Shearing equipment		
3. Blanking procedures		

<table>
<tr><td>Description of the blanking procedures. Accuracy of the blanking procedures. Technological aspects. Technological parameters
Constructive characteristics of the blanking dies. Geometry of the active components. Establishing the dimensions of the active components
Special blanking procedures
Fine blanking
Quick blanking
Blanking machines</td><td rowspan="7">kinematics of sheet metal forming processes by computer animation
• Static or animated schemes or sketches taken from the ALUMATTER Internet site are used for understanding phenomena specific to metal forming processes
• Online solution of applicative problems specific to the fields of material testing, sheet metal formability and analysis of metal forming processes by accessing the ALUMATER Internet site.
An interactive teaching style is used with the aim of assuring a cooperation between students and teacher, as well</td><td rowspan="7"></td></tr>
<tr><td>4. Bending
Description of the bending process. Accuracy of the bending procedures. Technological aspects. Technological parameters. Dimensioning the blank subjected to bending. Springback
Constructive characteristics of the bending dies</td></tr>
<tr><td>5. Bending
Geometry of the active components. Establishing the dimensions of the active components
Special bending procedures
Three-point bending
Profiling. Roll bending
Bending machines</td></tr>
<tr><td>6. Deep-drawing
Classification of deep-drawing procedures. Description of the deep-drawing process. Accuracy of the deep-drawn parts. Technological aspects. Technological parameters. Establishing the dimensions of the blank subjected to deep-drawing</td></tr>
<tr><td>7. Deep-drawing
Technological aspects. Definition of the drawing coefficient (m) and drawing ratio (beta). Establishing the number of drawing passes. Using the FLD method in the formability analysis</td></tr>
<tr><td>8. Deep-drawing
Constructive characteristics of the deep-drawing dies. Geometry of the active components. Establishing the dimensions of the active components</td></tr>
<tr><td>9. Deep-drawing
Advanced deep-drawing procedures
Hydraulically assisted deep-drawing</td></tr>
</table>

<table>
<tr><td>Deep-drawing with variable blank-holding force
Deep-drawing presses</td><td rowspan="6">as a thorough understanding and the enhancement of the knowledge acquired from courses. The students who exhibit interest and aptitudes in the field of metal forming are also encouraged to participate in research activities. Companies specialized in the field of metal forming are also visited during the stays of the students at the Stuttgart University.</td><td rowspan="6"></td></tr>
<tr><td>10. Plastic shaping procedures
Classification of the plastic shaping procedures (embossing, bordering, reduction, expansion). Technological aspects.
Shaping dies
Incremental forming using a lathe. Description of the procedure. Technological parameters.
Plastic shaping machines</td></tr>
<tr><td>11. Assembling procedures
Classification of the assembling procedures. Assembling machines</td></tr>
<tr><td>12. Extrusion processes
Classification of the extrusion processes. Technological aspects. Technological parameters. Establishing the dimensions of the preform
Constructive characteristics of the extrusion dies
Extrusion presses</td></tr>
<tr><td>13. Automation of the metal forming processes
Transfer lines used in the field of sheet metal forming processes</td></tr>
<tr><td>14. Virtual reality in the field of metal forming technologies
Modelling and simulation of metal forming processes.
Examples of virtual reality systems</td></tr>
</table>

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1. Banabic, D., Dörr, I.R., Modelarea si simularea proceselor de deformare a tablelor metalice, Editura Transilvania Press, Cluj Napoca, 1995.
2. Banabic D., Bünge H.J., Pöhlandt K., Tekkaya A.E., Formability of Metallic Materials, Editor: Banabic D., Springer Verlag, Heidelberg, 2000.
3. Banabic D., (Editor), Advanced Methods in Material Forming, Springer, Heidelberg, 2007
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6. Iliescu, C., Tehnologia presarii la rece, EDP, Bucuresti, 1991.
7. Lange, K., Lehrbuch der Umformtechnik (Band 4), Springer Verlag, Berlin, 1983-1989.
8. Romanovski, M., Stantarea si matritarea la rece, Editura Tehnica, 1970.
9. Spur, G., Handbuch der Fertigungstechnik. Umformen un Zerteilen, Carl Hanser Verlag, München, 1985.
10. Tapalaga, I., Achimas, Gh., Iancau H., Tehnologia presarii la rece (Vol. 1, 2), Lito UTCN, 1980, 1984
11. Tapalaga, I., Achimas, Gh., Iancau H., Banabic, D., Coldea, A., Tehnologia presarii la rece.

Indrumator de laborator, Lito UTCN, 1985.
12. Teodorescu M. si altii, Prelucrari prin deformare plastica la rece (Vol. 1 si 2), Editura Tehnica, 1987, 1989.
13. Wagner, S., Baur J., Banabic D., Vorlesung der Umformtechnik, UT Press, Cluj Napoca, 2010
14. *** Handbuch der Umformtechnik(Schuler), Springer Verlag, Berlin, 1996. (+CD)

Virtual teaching materials
1. Hirsch, J., Wagner S., Banabic D. – Alumatter- UMFORMTECHNIK-, www.alumatter.info

8.2. Applications/Seminars	Teaching methods	Notes
1. Constructive characteristics of the metal forming tools	Presentation and applications	
2. Press setup in order to perform cold metal forming operations		
3. Evaluating the blanking force		
4. Analyzing the variation of the deep-drawing force for circular and rectangular parts		
5. Analyzing the dimensional accuracy of deep-drawn parts		
6. Analyzing the hydraulic bulging process		
7. Analyzing the influence of the blank-holding force on the quality of the deep-drawn parts		

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1. Banabic D., (Editor), Advanced Methods in Material Forming, Springer, Heidelberg, 2007
2. Banabic D., Sheet Metal Forming Processes, Springer, Heidelberg Berlin, 2010
3. Ciocardia, C. s.a., Tehnologia presarii la rece, EDP, Bucuresti, 1991.
4. Iliescu, C., Tehnologia presarii la rece, EDP, Bucuresti, 1991.
5. Lange, K., Lehrbuch der Umformtechnik (Band 4), Springer Verlag, Berlin, 1983-1989.
6. Lăzărescu L., Comşa D.S., Banabic D., Analiza cu elemente finite a proceselor de prelucrare prin deformare plastică, Casa Cărţii de Ştiinţă, Cluj Napoca, 2018
7. Romanovski, M., Stantarea si matritarea la rece, Editura Tehnica, 1970.
8. Spur, G., Handbuch der Fertigungstechnik. Umformen un Zerteilen, Carl Hanser Verlag, München, 1985.
9. Tapalaga, I., Achimas, Gh., Iancau H., Tehnologia presarii la rece (Vol. 1, 2), Lito UTCN, 1980, 1984
10. Tapalaga, I., Achimas, Gh., Iancau H., Banabic, D., Coldea, A., Tehnologia presarii la rece. Indrumator de laborator, Lito UTCN, 1985.

8.3.Project work

The project work is focused on enhancing the knowledge of the students in the field of metal forming technological design, as well as in the field of die design. Previously acquired knowledge in the field of engineering graphics, machine elements, strength of materials, tolerances, fienite element method, and theory of plasticity will be also enhanced by designing metal forming tools (blanking or forming dies).
The project work involves:

- Technological design of a metal forming process using classical methods - Technological design of a metal forming process using numerical simulation - Constructive design of the metal forming tools involved in the manufacturing process - Tutoring (periodic meetings with the students). The project work is evaluated by assessing the quality of the written documentation, rhythmicity of the student activity, quality of the graphic documentation (technical drawings), quality of the data obtained from numerical simulation, as well as the quality of the project defense.
Bibliography 1. Lazarescu, L., Comsa D.S., Banabic D., Proiectarea tehnologiilor si a matritelor pentru prelucrarea tablelor metalice, Casa Cărţii de Ştiinţă, Cluj Napoca, 2018. 2. Tapalaga I., Achimas Gh., Iancau H., Tehnologia presarii la rece, Vol. I, II, Lito IPC-N, Cluj-Napoca, 1980, 1985; 3. Teodorescu M., s.a. Elemente de proiectare a stanţelor si matriţelor, EDP, Bucuresti, 1983 (ediţia I, 1977); 4. Romanovski V.P., Stan_area si matri_area la rece, Editura Tehnica, Bucuresti, 1970; 5. ASM HANDBOOK Volume 14: Forming and Forging, ASM International 1993 6. Suchy I., Handbook of die design, Mc GRAW-HILL, Second Edition 2006 7. Tschaetsch H., Metal Forming Practise, Processes – Machines – Tools, Springer-Verlag Berlin Heidelberg 2006 8. Grundlagen für die Produktion einfacher und komplexer Präzisions-Stanzteile, Vieweg Verlag, Ediţia a 8-a, 2006, 9. Doege E., Behrens B-A, Handbuch Umformtechnik, Grundlagen, Technologien, Maschinen, Springer Berlin Heidelberg New York, 2007

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The knowledge acquired by the students who attend this discipline will allow them to solve current technological and constructive design problems in the production/research departments of companies (Dacia Renault, Renault Technologie Roumanie, Ford, Continental, RAAL, etc.).

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	25 questions covering all the course topics	Written test – duration of 1.5-2 hours	75%
10.5 Applications	5 questions covering all the lab topics	Practical test – duration of 1 hour	25%
10.6 Minimum standard of performance			
10 correct answers in the total of 20 questions			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof.dr.ing. Dorel Banabic	
	Teachers in charge of application	Conf.dr.ing. Lucian Lăzărescu	

Date of approval in the Department of Manufacturing Engineering ________________________	Head of department Ș.l.dr.ing. Adrian Trif
Date of approval in the Machine Building Faculty Council ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*57.00*

2. Data about the subject

2.1	Subject name			**CNC Technologies**				
2.2	Subject area			Manufacturing engineering				
2.3	Course responsible/lecturer			Reader PhD. Eng.Carean Alexandru alexandru.carean@tcm.utcluj.ro				
2.4	Teachers in charge of seminars			Lecturer PhD. Eng. Ioan Alexandru POPAN, Ioan.popan@tcm.utcluj.ro				
2.5 Year of study	IV	2.6 Semester	1	2.7 Assessment	Exam	2.8 Subject category	DS/DOB	

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	18
Supplementary study in the library, online and in the field	15
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	16
Exams and tests	3
Other activities	

3.7	Total hours of individual study	62
3.8	Total hours per semester	104
3.9	Number of credit points	4

4. re-requisites

4.1	Curriculum	Descriptive Geometry and Technical Drawing, Materials, Machine Tools, Cutting Tools
4.2	Competence	Specific professional development of industrial engineering projects based selection, combination and use of knowledge, principles and methods

5. Requirements

5.1	For the course	Projector multi-media, blackboard

5.2	For the applications	Equipment from the laboratory “CNC Technologies”

6. Specific competences

Professional competences	C3.1. Describing the basic theories and methods in the field of computer programming and applied informatics specific to machine building technology. C3.2. Using the basic knowledge associated to software programs and digital technologies for explaining and interpret the issues of conceive and computer aided design of products, processes and technologies, in experimental and theoretical investigation of computerized data processing, specific to industrial engineering in general, and particularly in machine building technology. C3.3. Applying basic principles and methods of software programs and digital technologies for programming, database implementation, assisted graphics, modeling, computer aided design of products, processes and technologies, investigation and computerized data processing specific to industrial engineering in general, and particularly to machine building technology. C3.4. Appropriate use of standard assessment criteria and methods to assess the quality, advantages and limitations of software programs and digital technology in order to be used in specific tasks of industrial engineering in general, and particularly machine building technology. C3.5. Elaboration of the professional projects specific to industrial engineering, in general and to machine building technology, in particular, on the basis of selection, combination and use of principles, methods, digital technologies, information systems and software tools dedicated to the field. C4.1. Describing the theory, methods and basic principles for designing the processes specific to machine building technology. C4.2. Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. C4.3. Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. C4.4. Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and flexible manufacturing systems. C4.5. Elaborating professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs.
Cross competences	CT1. Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. CT3. Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication..

7. Discipline objectives

7.1	General objective	Developing skills in the field of cutting processing technologies on CNC machine tools (CNC programming and operating)
7.2	Specific objectives	1. Learning fundamental knowledge about CNC machine tools programming (machining and turning centers) 2. Gaining optimal CNC programming skills 3. Learning how to setup CNC machine tools (setting work piece zero and the tool length and radius offset)

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Fundamentals about numerical control. Short history. The basics of a CNC system. The advantages and disadvantages of MUCNs.	Oral presentation, notes on blackboard and multimedia presentation	Students are encouraged to ask questions
2. The information flow in a CNC system. Coordinate Axis System. Reference points.		
3. Elaboration of the CNC program. The programming language. Programming format. The syntax of a CNC block. CNC machining centers setup. Milling case study.		
4. CNC turning centers setup. Programming functions. Turning case study.		
5 Types of tool movements. Rapid positioning motion. Linear interpolation motion. Circular interpolation motion.		
6. Cutter radius compensation for milling. Cutter radius compensation. Cutter radius compensation cancel.		
7. Applications of cutter radius compensation. Case study.		
8. Tool nose radius offset. The influence of the radius at the tool nose tip.		
9. Tool nose radius offset at external and internal turning. Case study.		
10. Programming of the thread turning. Case study.		
11. Circular interpolation versus helical interpolation. Absolute programming and incremental programming.		
12. Programming methods for the tool's approach and retraction.		
13. Drilling cycles for machining centers and CNC turning centers.		
14. Advanced programming methods for turning and milling. Use of CNC subprograms. Parametric programming.		

Bibliography

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2. Cărean Al., Tehnologii de prelucrare cu CNC, Editura Dacia, Cluj–Napoca, 2002.
3. Damian, M., Cărean, Al., ş.a. Fabricaţie asistată de calculator, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2003.
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5. Roş, O. şi Cărean, Al., Tehnologia prelucrării pe maşini-unelte cu comandă numerică, Editura Dacia, Cluj Napoca, 1995.

8.2. Applications/Seminars	Teaching methods	Notes
1. Presentation of MUCN’s in TCM laboratory. Labor protection.	Practical work in the laboratory	Students are asked and encouraged to ask questions
2. Analysis of key functions and buttons of the HAAS operating panel of the VF 2SS machining center.		
3. Editing, simulating and running CNC programs on HASS equipment. Case study.		
4. Function analysis of the FANUC 0i-TB operating panel buttons of the LYNX 220 CNC Turning Center.		
5. Editing, simulating and running CNC programs on FANUC 0i-TB. Case study.		

6. Setup and operation of the machining center HAAS VF 2SS . Case study.		
7. Setup and operating of the LYNX 220 CNC turning center. Case study.		

Bibliography

1. Cărean, Al. Şi Popan, Al. Programarea şi operarea centrelor de prelucrare CNC, Editura U.T.PRESS, Cluj-Napoca, 2015.
2. Manual de programare si operare FANUC-Oi-TB, 2006.
3. Manual de programare si operare HAAS, 2009.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The professional skills in the advanced manufacturing technologies on CNC machining and turning center, gained during the course, are in line with the employer's expectations

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The ability to answer to theoretical questions and to solve practical problems	Written test (mark T)	T is 75%
10.5 Applications	The presence is compulsory (100%). The activity during classes is appreciated	Questions on each class (mark A)	A is 25%
10.6 Minimum standard of performance N =T + A			
The final credit can be received only if each of the mark's components is fulfilled: N≥5; T≥5; A≥5			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Reader PhD. Eng.Carean Alexandru	
	Teachers in charge of application	Lecturer PhD. Eng. Ioan Alexandru POPAN	

Date of approval in the department IF ________________________	Head of department Lecturer PhD. Eng. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	58.00

2. Data about the subject

2.1	Subject name			Technologies and Equipments for Assembly			
2.2	Subject area			Manufacturing Engineering			
2.3	Course responsible/lecturer			Lecturer dr.eng. Pacurar Ancuta Carmen – ancuta.costea@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Lecturer dr.eng. Pacurar Ancuta Carmen – ancuta.costea@tcm.utcluj.ro			
2.5 Year of study	IV	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	42	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	20
Supplementary study in the library, online and in the field	20
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	16
Tutoring	-
Exams and tests	6
Other activities	-

3.7	Total hours of individual study	62
3.8	Total hours per semester	104
3.9	Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	Manufacturing basics, Tolerance and dimensional control, Product design, Quality engineering, Manufacturing engineering, Non-conventional technologies
4.2	Competence	Adequate use of the criteria and methods regarding evaluation, design, analysis and quality of the industrial

		engineering field.

5. Requirements (where appropriate)

5.1	For the course	Multi-media projector
5.2	For the applications	CAD-CAM Laboratory, Software DFMA (Design for Manufacture and Assembly)

6. Specific competences

Professional competences	**C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology. **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. **C4.3.** Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. **C4.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. **C4.5.** Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs.
Cross competences	**CT2.** Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Establishing of the technological solutions that are adequate for certain practical applications of assembly of different products from the industrial field.	
7.2	Specific objectives	• Knowledge of the modernizing directions for the manual and robotized (automated) assemblies and of the equipment functioning for assembly systems; • Choose of the adequate technological solutions for assembling of different products from the industrial field; • Design for aseembly (manualy or automatically controlled); • Selecting of the adequate solutions for equipping the robotized assembly systems.	

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. The importance of the technologies and equipment for assembly. The role of the assembly process, classification of methods, symbols.		
2. Define the product family, to be assembled into the same line. Flexibility of the assembly systems. Different layouts of the assembly lines.		
3. Design the assembly process and technology.		
4. Requirements of the parts/shape from the assembly point of view, with respects to handling and to the assembly operations.		
5. Assembly sequence. Different methods of tolerance for the parts, in order to decrease the manufacturing costs, but to		

provide a good assembly functioning of the product.		
6. Assembly operations: assembly with screws, by pressing, by metal forming (bending, riveting, etc.) manual assembly.		
7. Assembly with robots.		
8.Select the appropriate systems (layout) for assembly with robots.		
9.Select the robots suitable for different assembly processes. Specific and effectors.		
10.Hight speed assembly for large volume production. Handling equipment (automated feeders).		
11. Sensors in automated assembly. Special device to orient the parts into the correct insertion position.		
12. Modern assembly equipment with artificial intelligence.		
13. Auto guided transportation and storing the parts for assembly layout. Estimate the assembly time and costs.		
14. Redesign the shape of the parts and the product structure, in order to switch from manual assembly to robotic and automated assembly.		

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1. Csaba Gyenge, **Ancuţa Păcurar**, Nicolae Bâlc, Răzvan Păcurar, Tehnologii şi echipamente de asamblare, Editura Tehnică Info Chişinău, 2015, 300 pag., ISBN 978-9975-63-383-3.
2. Marcu, V., Gyenge, Cs., Gligor, E., Bâlc, N., Proiectarea cu DFA (Proiectarea pentru asamblare), Editura Transilvania Press, Cluj-Napoca 1995, ISBN 973-97041-3-1.
3. Bâlc, N., Gyenge, Cs., Berce, P., Proiectare pentru Fabricaţia Competitivă, Cluj-Napoca, Editura Alma Mater, 310 pag., 2006.
4. Campbell, R.I., Balc, N., Virtual Engineering Applications for Design and Product Development, Printed by Media Services, Loughborough University (U.K.), 2003.
5. Ivan, N.V., Berce P., Bâlc, N., s.a., Sisteme CAD/CAPP/CAM – Teorie şi practică, Editura Tehnică, Bucureşti, 2004.

8.2. Applications/Seminars	Teaching methods	Notes
1. Designing of the manual assembly technologies. Case study.		
2. Setting the base parameters and the assembly scheme for the products: windscreen wiper for drive mechanism and auto oil filter.		
3. Designing of the assembly technologies for one passing valve.		
4.Designing of the assembly technologies for speed reducer.		
5.The calculations of the technological tolerance for two types of dimensional chains: with total and partial interchangeability.		
6.The elaboration of technical documentation assembly for an oil pump.		
7. Selecting the adequate assembly system (manual, robotic or automated) depending of the product type, the components number, production series and other parameters.		

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1. Csaba Gyenge, **Ancuţa Păcurar**, Nicolae Bâlc, Răzvan Păcurar, Tehnologii şi echipamente de asamblare, Editura Tehnică Info Chişinău, 2015, 300 pag., ISBN 978-9975-63-383-3.
2. Marcu, V., Gyenge, Cs., Gligor, E., Bâlc, N., Proiectarea cu DFA (Proiectarea pentru asamblare), Editura Transilvania Press, Cluj-Napoca 1995, ISBN 973-97041-3-1.

3. Bâlc, N., Gyenge, Cs., Berce, P., Proiectare pentru Fabricaţia Competitivă, Cluj-Napoca, Editura Alma Mater, 310 pag., 2006.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The gained knowledge are required for providing the expertise for the selection of the technological assembly solutions of different types of industrial products and for solving of different tasks required for the diploma project in the field of manually or automated assembly systems.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Individual work for students. Each student gets 4 examination subjects.	Written and oral individual subjects.	75%
10.5 Applications	Laboratory classes work.	Evaluate the laboratory work.	25%
10.6 Minimum standard of performance			
Exam mark ≥ 5 ; Laboratory work ≥ 5			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Lecturer dr.eng. Ancuta Pacurar	
	Teachers in charge of application	Lecturer dr.eng. Ancuta Pacurar	

Date of approval in the department IF ________________________	Head of department S.l.dr.ing. Trif Adrian
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	60.20

2. Data about the subject

2.1	Subject name			Numerical Methods			
2.2	Subject area			Mathematics			
2.3	Course responsible/lecturer			Prof. Dr. Eng. Ancău Mircea, mircea.ancau@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Prof. Dr. Eng. Ancău Mircea, mircea.ancau@tcm.utcluj.ro			
2.5 Year of study	4	2.6 Semester	1	2.7 Assessment	Coll	2.8 Subject category	DS/DOP

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	28	3.5 of which, course:	14	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	15
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	10
Exams and tests	5
Other activities	-

3.7	Total hours of individual study	50
3.8	Total hours per semester	78
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Mathematical analysis, algebra, analytic geometry, computer programming
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	Projector multi-media, blackboard

5.2	For the applications	Personal computer, C++ compiler, Matlab

6. Specific competences

Professional competences	**C3.1.** Describing the basic theories and methods in the field of computer programming and applied informatics specific to machine building technology. **C3.2.** Using the basic knowledge associated to software programs and digital technologies for explaining and interpret the issues of conceive and computer aided design of products, processes and technologies, in experimental and theoretical investigation of computerized data processing, specific to industrial engineering in general, and particularly in machine building technology. **C3.3.** Applying basic principles and methods of software programs and digital technologies for programming, database implementation, assisted graphics, modeling, computer aided design of products, processes and technologies, investigation and computerized data processing specific to industrial engineering in general, and particularly to machine building technology. **C3.4.** Appropriate use of standard assessment criteria and methods to assess the quality, advantages and limitations of software programs and digital technology in order to be used in specific tasks of industrial engineering in general, and particularly machine building technology. **C3.5.** Elaboration of the professional projects specific to industrial engineering, in general and to machine building technology, in particular, on the basis of selection, combination and use of principles, methods, digital technologies, information systems and software tools dedicated to the field.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To obtain knowledge concerning numerical methods.
7.2	Specific objectives	To know how to chose a specific numerical method to solve an equation, a system of linear/nonlinear equations; To know how can be calculated a derivative, a simple or multiple integral using numerical methods; To know numerical optimization methods; To know heuristic algorithms for solving combinatorial optimization problems.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
NUMBERS APPROXIMATION Absolute and relative errors; Basic sources of errors;	Exposing, problem solving	Computer, video-projector
NUMERICAL METHODS FOR EQUATIONS SOLVING The boundaries of real roots of an algebraic equation; The number of the real roots of an algebraic equation.		
NUMERICAL METHODS FOR EQUATIONS SOLVING Aproximarea soluţiilor ecuaţiilor algebrice; Determinarea grafică a rădăcinilor ecuaţiilor algebrice;		

NUMERICAL METHODS FOR EQUATIONS SOLVING Halving method; Method of chords; Newton's method (tangent's method); Ruffini's method; The method of Lagrange;		
NUMERICAL METHODS FOR SISTEMS OF EQUATIONS SOLVING Generalities; The rule of Cramer; The method of Gauss; Iterative method;		
APPROXIMATE SOLUTIONS OF SISTEMS OF NONLINEAR EQUATIONS Method of Newton;		
THE INTERPOLATION OF FUNCTIONS Finite differences; Tables of finite differences; Generalized power; Statement of the problem interpolation; Newton's first interpolation formula;		
THE INTERPOLATION OF FUNCTIONS Lagrange's interpolation formula; Least squares linear interpolation formula.		
APPROXIMATE DIFFERENTIATION Introduction; Numerical differentiation based on first interpolation formula of Newton; Graphical differentiation.		
NUMERICAL INTEGRATION Introduction; Trapezoidal quadrature formula; Chebyshev quadrature; Gauss quadrature;		
MONTE CARLO METHOD Introduction; Random numbers; Simple quadratures calculation; Multiple quadratures calculation;		
COMBINATORIAL OPTIMIZATION Introduction; Traveling Salesman Problem. The calculation of the minimum length path		
COMBINATORIAL OPTIMIZATION Johnson's algorithm. The calculation of an optimal flowshop schedule.		
COMBINATORIAL OPTIMIZATION Minkowski sums. Optimal nesting problems.		
Bibliography Ancău, M., Ancău, D.M. *Metode numerice*. Editura Universităţii Tehnice din Cluj-Napoca UTPress, 2011. Demidovich, B.P., Maron, I.A. *Computational mathematics*, MIR Publishers, Moscow, 1987. Press, W., et al. *Numerical Recipes in C*, Cambridge university Press, 1992.		
8.2. Applications/Seminars	Teaching methods	Notes
Brief tutorial about MathCAD.	Plan of laboratory session	Individually or group solving of laboratory themes, under the supevision of a teacher
Find real roots of an algebraic equation using the halving method.		
Numerical quadrature by trapezoidal and rectangle rule.		
Mono and Multiple Monte Carlo quadrature.		
Linear interpolation by least squares method.		
The calculation of the tool-path minimum length at printed circuit boards drilling on CNC machine-tool (the algorithm of Metropolis).		
Graphical representation of Legendre polynoms in MathCAD.		
Bibliography Ancău, M., Ancău, D.M. *Metode numerice*. Editura Universităţii Tehnice din Cluj-Napoca UTPress, 2011. Demidovich, B.P., Maron, I.A. *Computational mathematics*, MIR Publishers, Moscow, 1987. Press, W., et al. *Numerical Recipes in C*, Cambridge university Press, 1992.		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The acquired competences are necessary to make semester or year projects, diploma project, and later on, to solve different practical problems in future industry production.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Solve two theoretical subjects and a problem	Writing – duration 1.5 – 2 hours	75%
10.5 Applications	Solve an application in MathCAD	Writing – duration 1.5 – 2 hours	25%
10.6 Minimum standard of performance			
The final credit can be received only if each of the mark's components is fulfilled: The solving of each of the three subjects (2 theoretical + 1 problem) by minimum of 5 score.			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Prof.dr.eng. Mircea Ancău	
	Teachers in charge of application	Prof.dr.eng. Mircea Ancău	

Date of approval in the department IF _________________________	Head of department Lect.dr.ing. Adrian Trif
Date of approval in the faculty CM _________________________	Dean Prof.dr.ing. Corina BÎRLEANU

MINISTERUL EDUCAȚIEI NAȚIONALE

UNIVERSITATEA TEHNICĂ DIN CLUJ-NAPOCA

SYLLABUS

1. Data related to the programme of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of Study	Industrial Engineering
1.5	Study Level	Bachelor of Engineering
1.6	Programme of study/Qualification	Manufacturing Engineering / Engineer (TCM)
1.7	Full or part time (Type of attendance)	IF-Full time attendance
1.8	Subject code	60.30

2. Data related to the subject

2.1	Subject name	Mechanization and Automation of Technological Processes									
2.2	Subject area	Manufacturing engineering									
2.3	Course responsible	Prof. PhD. Eng. Grozav Sorin, Sorin.Grozav@tcm.utcluj.ro									
2.4	Seminar/lab classes/project in charge of	Asist. PhD. Eng. Ceclan Vasile, Vasile.Ceclan@tcm.utcluj.ro									
2.5	Year of study	IV	2.6	Semester	1	2.7	Assessment	Coll.	2.8	Subject category	DS/DOP

3. Total estimated time

3.1	No. of hours per week	2	3.2	of which lecture	1	3.3	Applications	1
3.4	Total no. of hours in the curriculum	28	3.5	of which lecture	14	3.6	Applications	14

Individual study	Hours
Learning from manuals, course notes, bibliography	18
Additional reading and documentation in libraries, electronic platforms and field	16
Preparation of seminars/lab classes, assignments, reports, portfolios, essays	10
Tutorial classes	2
Exams and tests	2
Other activities	2

3.7	Total no. of hours of individual study	50
3.8	Total no. of hours per semester	78
3.9	No. of credit points	3

4. Pre-requisites (where necessary)

4.1	Of curriculum	Machine parts,
4.2	Of competences	**C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology.

5. Requisites (where necessary)

5.1	To run the courses/lectures	Projector multi-media, blackboard
5.2	To run the applications	Equipment from the laboratory “Machine of cool deforming”

6 Specific competences

Professional competences	**C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology. **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7 Subject objectives (according to the specific competences)

7.1	General subject objective	Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology.
7.2	Specific objectives	- Choose the type of machine processing depending on the operation to be performed; - Choose materials that run various components of machines by plastic deformation; - To design machines by plastic deformation processing.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	General construction of automatic equipment for the mechanization and automation of technological processes of cutting and deformation.	Oral presentation, notes on blackboard and multimedia presentation	Students are encourage d to ask questions
2	Development stage of the construction of automatic equipment for mechanization and automation of machining and deformation processes and trends that manifested in their construction.		
3	General problems regarding the construction and design of automatic equipment for the mechanization and automation of technological processes of cutting and deformation. Mechanisms used to carry the principals movement.		
4	Automated equipment for the mechanization and automation of technological processes of cutting and deformation. Application range and classification.		
5	Geometric measurements of main movement mechanism of automatic equipment. Calculation of main movement mechanism forces the automatic equipment.		
6	Hydraulic equipment used in the construction of automatic equipment for the mechanization and automation of technological processes of cutting and deformation. The main design elements of the hydraulic system. Hidrocinematics schemes of hydraulic presses.		
7	Construction and Hydraulic calculation. Terms of rising the operating pressure in cylinder presses hydraulic. Influent elastic deformations on the functioning hydraulics.		

8	Advance mechanisms for flats and processing belts driven		
9	Automatic presses and devices for mechanization cold stamping operations		
10	Mechanization and automation of auxiliary and preparatory works		
11	Devices for removal of dies and molds parts		
12	Devices for advances of the semi-finished pieces		
13	Automatic stamps		
8.2. Lab classes			
1	Choice of automatic equipment for the mechanization and automation of technological processes of cutting and deformation.	Practical work in the laboratory	Students are asked and encourage d to ask questions
2	Workings verify the accuracy of automatic equipment for the mechanization and automation of technological processes of cutting and deformation.		
3	Structure and working mode of control systems and automatic coupling equipment mechanization and automation of technological processes of cutting and deformation.		
4	Structure and regulation of automatic equipment for the mechanization and automation of technological processes of cutting and deformation.		
5	Structure and mode of parts and waste extractors dies or molds		
6	Determination of pieces crossing in the gutter		
7	Syntheses works.		

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2. Grozav, S., Tătaru, O., Gagiu, Al., Procedee speciale de prelucrare a metalelor, Editura ROPRINT 1998, Cluj- Napoca, ISBN 973-9298-46-X, 216 pag.
3. Grozav, S., Achimas, Gh., Proiectarea maşinilor unelte pentru prelucrări prin deformare plastică, Îndrumător de lucrari, Editura MEDIAMIRA, 2002, Colecţia Inginerului, ISBN 973-9357-0-6.
4. Grozav, S., Maşini de prelucrare prin deformare plastică, Editura MEDIAMIRA, 2009, Colecţia Inginerului, ISBN 978-973-713-237-6, 233 pag.
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6. Grozav, S., Ceclan, V., Popescu, A., Utilaje și tehnologii pentru prelucrare prin deformare plastică, vol. I Utilaje de prelucrare prin deformare plastică, Editura JRC, 2015, Turda, ISBN 978-606-8009-12-4
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12. Kuric, I., Grozav, S., s.a., Mechanization and automation equipment for processing, Publish House Alma Mater, Cluj Napoca, 2015, ISBN 978-606-504-188-2, 483 pag.
13. Sorin Grozav, Vasile Ceclan, Adrian Popescu Ivan Kuric, Nadezda Cubonova, Darina Kumicakova, Miroslav Cisar, Vladimir Bulej, Dariusz Wiecek - Equipment for plastic deformation and the automation process, Publish House EDIS, Zilina, Slovacia, 2018, 512 pagini, ISBN 978-606-8009-12-4.

9. Relationship between subject content and expectations of professional community, professional associations and employers in the field of the study programme

Acquired skills will be required that employees and companies operating in the manufacturing profile in the department of engineering construction, the design of technology.

10. Assessment

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weigh in the final mark
Lecture	The ability to answer to theoretical questions	Written test (mark LS) and oral presentation of a specific task (mark RO)	**PC=10%** **LSL=20%** **LS=50%** **RO=20%**
Applications	Solve practical problems Present of the hours (PC)	Questions on each class(LSL)	
10.4 Minimum performance standard : N=**PC+LSL+LS+RO**			
The final credit can be received only if each of the mark's components is fulfilled: N≥5; LSL≥5; RO≥5; LS≥5			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer	Prof. dr. ing. Grozav Sorin	
	Teachers in charge of application	ŞL. dr. ing. Ceclan Vasile	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	61.00

2. Data about the subject

2.1	Subject name			Manufacturing Engineering			
2.2	Subject area			Manufacturing Engineering			
2.3	Course responsible/lecturer			Assoc. Prof. PhD.Enq. Mircea MERA, Mircea.Mera@ tcm.utclui.ro			
2.4	Teachers in charge of seminars			Assoc. Prof. PhD.Enq. Mircea MERA, Mircea.Mera@ tcm.utclui.ro			
2.5 Year of study	4	2.6 Semester	2	2.7 Assessment	EX	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 applications:	28

Individual study	74 hours
Manual, lecture material and notes, bibliography	29
Supplementary study in the library, online and in the field	20
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	20
Tutoring	2
Exams and tests	3
Other activities	

3.7	Total hours of individual study	74
3.8	Total hours per semester	130
3.9	Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	Tolerance and measurement ,Machine elements, Devices, BAGS, Cutting tools, Machine-tools, Tehnical draw, TPMUCN
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	The students will have the mobile phones close, it will not be admited mobile calls doring the course, also it will not be admited the leaving of students for responding at mobile calls, it will not be tolerated the student delay at courses and laboratories.
5.2	For the applications	The deadline for projects will be established by project owner in agreement with the students. It will be established a recovery procedure for project classes.

6. Specific competences

Professional competences	**C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology. **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. **C4.3.** Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. **C4.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. **C4.5.** Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs. **C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology. **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	- To form competences related by design technologies of manufacturing gears,elaboration of the documentation and the quality proof in manufacturing.
7.2	Specific objectives	- To develop the evaluation capacity ,analyze,interpretation and conclusion based on the arguments of specific technological situations. - To develop the knowledg about the role of TCM engineers in leadership of manufacturing process.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Chapter 1 The technology of machining cylindrical gears 1.1 Milling, mortising and grinding of cylindrical gears by copying method; 1.2 Milling the cylindrical gear teeth with the hob mill;	Lecture	

1.3 Mortising the spur gear teeth with cutting wheel gear; 1.4 Mortising the spur gear teeth with rack-type cutter; 1.5 Spur gear teeth grinding with biconical discs; 1.6 Spur gear teeth grinding with plate discs; 1.7 Spur gear teeth grinding by the Reishauer process 1.8 Spur gear teeth grinding with large diameter abrasive discs; 1.9 Finishing of toothed wheels by shaving **Chapter 2** Worm gearing technology 2.1 Worm manufacturing by turning. 2.2 Worm manufacturing by milling and grinding. 2.3 Manufacturing of worm wheels with radial and tangential feed **Chapter 3** Conical gears manufacturing technology. 3.1 Specific Technological Problems (Choosing the Technological Basis, etc). 3.2 Manufacturing technology for spur gear and helical gear. 3.3 Spiral Bevel Gear technology. 3.4 Spiral Bevel Gear with spiral and helical teeth. 3.5 Cyclopaloid tooth technology. 3.6 Bevel Gear flanks finishing.		
Bibliography Gyenge, Cs., Fratila. D. Ingineria fabricatiei. Editura Alma Mater, Cluj-Napoca, 2004, ISBN 973-8397-77-7, 150 pages Gyenge, Cs., Ros. R. and Popa, M.: Tehnologia fabricarii masinilor unelte, Editura UT. Cluj. 1990, 478 pages Pruteanu, O., Epureanu, Al., Bohosievici, C. and Gyenge, Cs.: Tehnologia Fabricarii Masinilor, Bucuresti, Editura Diadactica si Pedagogica. 1981, 588 pages		
8.2. Applications	Teaching methods	Notes
Project *Designing and studying the manufacturing process of .... drawing number .... for a manufactering program of .... piece/year.* 1. The constructive- functional analysis of the piece and the drawing of a complete definition based of the principle of indicating all the elements defining the shape and the conditions imposed by the functionality. It will be analyzed the functional role with emphasizing the main and functional surfaces, the shape technology and quotation system, used material. It will be used a computer assisted drawing. 2. Elaboration and description of the computer-assisted technological itinerary, in the conditions of using modern technical equipment. The drawn itinerary will be presented in the form of a table with operational sketches showing the base and fixation of the workpiece, as well as the surfaces that are being processed in that operation. These sketches show only the main quotations that are made, the quality of the processed surfaces.	Dialogue	

3. Making technological calculations for 3 operations (after complexity and necessity). It will also be calculated and presented systematically with tables, machining additions, intermediate dimensions, cutting parameters and energy consumption. Tool catalogs for choosing and / or programs for calculating the value of the cutting parameters will be used. 4. Making the machining schemes, the tool adjustment plane and the programming sheet, for an operation that is performed on program-controlled machine. 5. Preparation of technological documentation: 3 specific operation planes, tool, devices, measurement equipment list. The operating drawings will be made in a specific drawing software and will include: - proportional sketch of the part in the shape it will have at the end of the operation, showing with thick or colored lines the surfaces that are being processed in the respective operation; for some portions that are small will be prepared enlarged details; - indication of the orientation and fixation method in the technological system; - the technological quote for all sizes that are performed in the respective operation (no reference to internal standards or rules is allowed); indication of the quality of the surfaces to be processed; - detailed drawings, technological allowances for threads, teeth, recesses etc; - conditions of technical precision of the shape and position required for the operation. The operation plan form will be completed in all fields. 6. Economic calculation. Calculate the cost price for the 3 analyzed operations in detail. - written part: 15-30 pages; - graphic part: refined drawing of the workpiece, machining layout, tool positioning plane and operating planes for 3 A1 formats.		

Bibliography

Gyenge, Cs., Fratila. D. Ingineria fabricatiei. Editura Alma Mater, Cluj-Napoca, 2004, ISBN 973-8397-77-7, 150 pages.

Gyenge, Cs., Ros. R. and Popa, M.: Tehnologia fabricarii masinilor unelte, Editura UT. Cluj. 1990, 478 pages.

Pruteanu, O., Epureanu, Al., Bohosievici, C. and Gyenge, Cs.: Tehnologia Fabricarii Masinilor, Bucuresti, Editura Diadactica si Pedagogica. 1981, 588 pages.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Meetings with company representatives, study targets, internships, to identify the economic environment in order to adapt the curricula, the analytical program, the disciplinary files and the labor market requirements.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	- to design a technological process for a complex piece; - to detail the components of the manufacturing process; - to propose the appropriate manufacturing process; - to know the current technologies of manufacturing of complex parts and gears; - analyze the economic aspects of manufacturing processes; - use the computer to design the manufacturing process.	The exam consists of verifying in written and oral the knowledge	70%
10.5 Applications	- evaluating the ability to use correctly the methods, the models presented at courses; - evaluation of right using of machine tools and SDV during experiments; - evaluation of analytical capacity of technological aspects at technological design	The presentation of the project	30%
10.6 Minimum standard of performance			
To know the main procedures and technologies,which are used in the industrial practice, to determine the values of the cutting regime, to design,assisted by computer a technological process for a complexe piece,in independent and individual professional conditions,to know the current technologies of gear manufacture.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Assoc. Prof. PhD.Enq. Mircea MERA,	
	Teachers in charge of application	Assoc. Prof. PhD.Enq. Mircea MERA,	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	62.00

2. Data about the subject

2.1	Subject name			Manufacture of Plastic and Composites Parts			
2.2	Subject area			Plastic Materials			
2.3	Course responsible/lecturer			Prof.dr.ing. Hancu Liana- Liana.Hancu@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Conf.dr.ing. Bere Paul, Paul.Bere@tcm.utcluj.ro			
2.5 Year of study	IV	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	28	3.5 of which, course:	14	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	28
Supplementary study in the library, online and in the field	14
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	4
Tutoring	2
Exams and tests	2
Other activities	

3.7	Total hours of individual study	50
3.8	Total hours per semester	80
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Mechanics, Materials strength, Technical drawing, Machine parts, Manufacturing technologies, Chemistry
4.2	Competence	To know how to design parts and devices,

5. Requirements (where appropriate)

5.1	For the course	Multimedia projector, blackboard
5.2	For the applications	Laboratory equipment

6. **Specific competences**

Professional competences	C4.1. Describing the theory, methods and basic principles for designing the processes specific to machine building technology. C4.2. Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. C4.3. Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. C4.4. Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. C4.5. Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs
Cross competences	

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	To achieve and develop competences in the field of manufacturing parts made of plastic and composite materials.
7.2	Specific objectives	1. To assimilate the theoretical knowledge and the practical skills in the field of manufacturing parts of plastic and composite materials 2. To design the plastic parts and the moulds used for manufacturing.

8. **Contents**

8.1. Lecture (syllabus)	Teaching methods	Notes
1.General knowledge of plastic and composite materials. Definitions and classifications of plastic and composite materials. Advantages, disadvantages and domain of usage. Short history and evolution.	Oral and multimedia presentation, notes on the blackboard	Students are encouraged to ask questions
2.Types of plastic materials and components. Characteristics and proprieties of plastic materials. Plastic material's manufacturing technologies. Pressing of thermoresistant materials. Extrusion and calendering.		
3.Thermoforming of thin plastic sheets. Rotoforming.		
4.Injection moulding. Equipment and moulds. Plastic material part's design.		
5.Composite materials. Definition and classification. Applications. Characteristics and proprieties..		
6.Structure of composite materials. Contact forming. Forming through		

simultaneously spreading.		
7.Bag forming. Resin transfer molding. Bulk moulding of premix.Compression moulding of preimpregnated sheets.Tubes forming through filamentarywinding. Forming through injection molding. Pultrusion forming.		
Bibliography 1.Hancu, L., Iancau, H., Tehnologia materialelor nemetalice. Tehnologia fabricării pieselor din materiale plastice, Editura ALMA MATER, 2003, 254 pagini, ISBN 973-8397-34-0. 2.Horun,S., Paunica,T., Sebe,O., Serban,S., Memorator de materiale plastice si auxiliari. Editura Tehnica, Bucuresti,1988. 3.Iancău,H., Nemeş, O., Materiale compozite- concepţie şi fabricaţie, 2002, 155 pagini, editura MEDIAMIRA-Cluj Napoca 4.Tentulescu,D., Tentulescu,L., Fibre de sticla. Edtura Tehnica, Bucuresti, 1994. 5.Seres, I., Injectarea materialelor plastice . Editura Imprimeriei de Vest, Oradea,1996 6.Hancu Liana- prezentari Power Point		

8.2. Applications/Seminars	Teaching methods	Notes
1.Plastic and composite materials' mechanical characteristics determination through traction testing	Practical work in the laboratory.	Students are asked and encouraged to ask questions
2.The influence of technological parameters during the pressing forming, upon the quality of the parts made of thermo resistant materials.		
3.The influence of technological parameters during the thermo-forming of plastic sheets, upon the quality of the parts made of thermoplastic materials.		
4.Settlement of the flowing capacity of some thermoplastic materials through flowing index determination.		
5.The influence of technological parameters and parts design upon the quality of the injection molding products, using flow simulation programs.		
6.Contact forming, materials and technology		
7.Technological characteristics at filamentary rolling.		
Bibliography 1.Liana Hancu, Horaţiu Iancău, Alina Crai, Tehnologia fabricării pieselor din materiale plastice : Studii de caz , - Cluj-Napoca : Alma Mater, 2007 , ISBN 978-973-7898 2. Liana Hancu, Paul Bere, Adrian Popescu, Emilia Sabau, (2015), Materiale compozite cu matrice polimerică, Îndrumător de laborator, Editura UT Press, 190 pag., ISBN 978-606-737-115-4;		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Plastic and polymeric based composites materials represent a category of engineering materials that have a special scientific and technical interest in the professional community because of their numerous advantages. Manufacturing parts made of composites is a new engineering domain with many benefits and the industrial units need well prepared engineers in this field.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Questions and problems from the lectures and	Written test- 2 hours	80%

	bibliography (mark T)		
10.5 Applications	Question during classes (mark L)	Practical evaluation- at each application	20%
10.6 Minimum standard of performance			
Final mark: T+L>5 (T>5 si L>5)			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof. eng. Liana Livia HANCU, PhD	
	Teachers in charge of application	Conf. eng. Bere Paul, PhD	

Date of approval in the department IF

____

Head of department
S.L.dr.ing. Adrian TRIF
.

Date of approval in the faculty CM

____

Dean
Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*63.00*

2. Data about the subject

2.1	Subject name	Technologies for Flexible Manufacturing Systems
2.2	Subject area	C4, C5
2.3	Course responsible/lecturer	Lecturer Panc Nicolae, Ph.D. Eng. Adresa de email: nicolae.panc@tcm.utcluj.ro
2.4	Teachers in charge of seminars	Lecturer Panc Nicolae, Ph.D. Eng. Adresa de email: nicolae.panc@tcm.utcluj.ro

2.5 Year of study	IV	2.6 Semester	II	2.7 Assessment	E	2.8 Subject category	DS/DOP

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	78	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	14
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	2
Exams and tests	2
Other activities	

3.7	Total hours of individual study	36
3.8	Total hours per semester	78
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

6. Specific competences

Professional competences	After completing the discipline, students will be able to: - use the basic knowledge to explain the functioning mode of the flexible manufacturing systems that exist in industrial environment; (C4 and C5) - apply basic principles and methods for designing manufacturing technologies in flexible manufacturing systems; (C4 and C5) - appropriate use of standard evaluation criteria and methods, in order to evaluate the quality, advantages and limitations of flexible manufacturing systems in the parts manufacture specific to machine building technology; (C4 and C5) - program the numerical control equipment; - exploit flexible manufacturing equipment;
Cross competences	Responsible execution of tasks required in laboratory activities through team work, IT usage, decision making in solving problems that arise in application activities. Efficient use of knowledge gained in other disciplines, corroborated with the knowledge gained in TSFF discipline, in deciding the optimal technologies that required for different parts families.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Developing skills in flexible manufacturing technologies field and their usage.
7.2	Specific objectives	1. Assimilation of theoretical knowledge regarding flexible manufacturing systems; 2. Forming the skills required to design technologies in flexible manufacturing systems; 3. Obtaining skills to develop new technologies by designing them using flexible manufacturing systems;

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
I. Brief history, definition, manufacturing systems place and role in machine building industry. - SFFs definition - SFFs structure - the hierarchy of flexibility concept. - defining flexibility. - the economic benefits of flexible systems	Exposure, discussion, heuristic approach, problem-solving	
II. SFF classification - by parts shape, - by technological process type, - by automation degree, - by how the machines are placed in the system		
III. Manufacturing task and system design analysis - setting parts family		
III. Manufacturing task and system design analysis - database construction with family parts characteristics: geometric, technological, production series		

III. Manufacturing task and system design analysis - compiling statistical analysis histograms		
IV. SFF structure - The processing subsystem;		
IV. SFF structure - The processing subsystem;		
IV. SFF structure - the logistical subsystem of materials, tools, measurement and control operations;		
IV. SFF structure - informatics subsystem;		
V. Specific equipment for flexible systems		
VI. Industrial robots VI.1 Construction and execution		
VI.2 Industrial robots programming		
VII. Flexible assembly line design principles		

Bibliography

1. Vuscan I., Panc N., Bazele prelucrarilor mecanice, Ed.Eikon-Scoala Ardeleana, Cluj-Napoca, 2015
2. Warneke, W., FMS – Flexibile Manufacturing Systems. Springer Verlang; London 1988.
3. Brisan C.M., Sisteme flexibile de fabricatie, Ed. UTPress, 1998
4. Dusa P., Proiectarea tehnologiilor in sisteme flexibile, Ed Univ.Gh. Asachi Iasi, 1996
5. Popa .I.F., Duta L., Sisteme flexibile de fabricatie, Ed. Agir, Bucuresti, 2007
6. Catrina D, si altii, Sisteme flexibile de productie, Ed. MatrixRom, Bucuresti, 2008
7.Brad Emilia, Bazele sistemelor flexibile de fabricatie si elemente de fabricatie supla (LEAN), Ed. UTPress, Cluj-Napoca, 2013

8.2. Applications/Seminars	Teaching methods	Notes
L1. Setting up parts family, typological filtering. Typological nucleus determination	Exposure, problem solving and heuristic approach. Programming Kuka KR180 robot + laboratory applications	
L2. Generalized manufacturing technology. Determining machine type in the System. Determining the number of machines of each type. Determining system load. Machine self-regulation in the system.		
L3. Industrial robots programming		
L4. Application 1 on industrial robot Kuka KR180		
L5. Application 2 on industrial robot Kuka KR180		
L6. Application 3 on industrial robot Kuka KR180		
L7. Application 4 on industrial robot Kuka KR180		

Bibliography

1. Vuscan I., Panc N., Bazele prelucrarilor mecanice, Ed.Eikon-Scoala Ardeleana, Cluj-Napoca, 2015
2. Brisan C.M., Sisteme flexibile de fabricatie, Ed. UTPress, 1998,
3. Manual de programare a robotului Kuka KR180

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The acquired skills will be required for engineers to design manufacturing technologies in flexible systems and to operate manufacturing flexible systems.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the

			final grade
10.4 Course	Written exam with three topics from the chapters presented in the course and elaboration of a SFF technology on the subject.	Written test - duration of assessment 2 - 2 hours	80%
10.5 Applications	Solving laboratory applications for each work done	Laboratory work verification	20%
10.6 Minimum standard of performance			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Lecturer Panc Nicolae, Ph.D. Eng.	
	Teachers in charge of application	Lecturer Panc Nicolae, Ph.D. Eng.	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. TRIF Adrian
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Management and Economic Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	64.00

2. Data about the subject

2.1	Subject name			Industrial management			
2.2	Subject area			Management			
2.3	Course responsible/lecturer			Şef lucr.dr.ing. Oţel Călin Ciprian – calin.otel@mis.utcluj.ro			
2.4	Teachers in charge of seminars			Şef lucr.dr.ing. Băcilă Gabriela - gabriela.bacila@mis.utcluj.ro			
2.5 Year of study	IV	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DOB-DS

3. Estimated total time

3.1 Number of hours per week	3	3.2 of which, course:	2	3.3 applications:	1
3.4 Total hours in the curriculum	78	3.5 of which, course:	28	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	14
Supplementary study in the library, online and in the field	6
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	-
Exams and tests	2
Other activities	-

3.7	Total hours of individual study	36
3.8	Total hours per semester	78
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

6. Specific competences

Professional competences	**C6.1.** Defining the concepts, theories, methods and basic principles for planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment. **C6.2.** Using the basic knowledge for explanation and interpretation the issues that arise in planning, management and usage of the manufacturing processes and systems on classic machines and/or CNC as well as in quality assurance and product ascertainment. **C6.3.** Applying of basic principles and methods for planning, management and usage of manufacturing processes and systems, as well as for quality assurance and product ascertainment, under qualified assistance. **C6.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, the advantages and the limits of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product including dedicated software. **C6.5.** Elaborating professional projects by using the principles and methods established in the field of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product inspection.
Cross competences	

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The development of skills in planning, management and operation of manufacturing processes and systems.
7.2	Specific objectives	1. Assimilation of theoretical knowledge on organizational design and planning of modern manufacturing and stock systems. 2. Achieving the skills for: - choosing the appropriate supply and storage procedure for stock items; - determination of the size of production capacity and its utilization for various productive entities (job, group of machines, workshop, department of plant, plant); - assessing the economic efficiency of technologies and equipment; - determining the best options for the location of equipment in a production workshop.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Management of production, concept, utility. Operations of manufacturing and services. Productive systems.		
The design and management of inventory systems: - Stocks and their functions. Costs of inventory system;		

- The determination of batch size supply: the simple classical model (ideal);	Exposure, discussions	
The design and management of inventory systems: - The classical model with finite rhythm supply; - The model when a machine processes several types of products;		
The design and management of inventory systems: - The optimal batch for products with limited seasonal demand; - The optimal batch in the presence of aggregates constraints.		
Considerations on batching in systems with multiple stages.		
The design and management of inventory systems: - The determination of the path to reunify stock: determination of the point to launch the order, determination of the safety stock; - ABC classification of stocks.		
Inventory management systems - determination of systems parameters (s, Q), (S, S), (S, R), (S, S, R); methods and modern techniques in storage strategies.		
Production capacity in machine building: - to define capacity and its utilization, factors of influence, principles of calculations. - to determine the production capacity at the level of job for homogeneous and heterogeneous production.		
Production capacity in machine building: - to determine the production capacity at the level of group of machines, workshop, department of plant, plant for homogeneous and heterogeneous production.		
Production capacity in machine building: - Optimization of production capacity.		
Unique production scheduling: - Development of network; - Schedule the activities;		
Unique production scheduling: - Analysis and resource allocation.		
Series production scheduling: - Manufacturing cycle; - Methods of the transmission of parts between operations; - Organization of production.		
Modern production systems (SFF, JIT, CIM, Kanban, SMED, etc.).		

Bibliography

1. Cândea, D., Abrudan, I., *Organizarea şi conducerea întreprinderilor industriale,* Litografia Institutului Politehnic, Cluj-Napoca, 1984.
2. Abrudan, I. şi Cândea, D., - coordonatori, Lungu, F., ş.a. *Manual de inginerie economică. Ingineria şi managementul sistemelor de producţie*, Editura Dacia, Cluj-Napoca, 2002.
3. Abrudan, I., Lungu, F., *Sisteme de stocuri şi capacitatea de producţie.* Teste grilă. Editura Todesco, Cluj-Napoca, 2006

8.2. Applications/Seminars	Teaching methods	Notes
Elements of statistics, probability theory and mathematical linear programming.	Exposure and applications	
Evaluating the economic efficiency of assimilation of advanced technologies.		
Determination of the optimal size of the batch supply.		
Issues concerning the safety stocks. Inventory management systems.		

ABC analysis of stocks.		
Determination of production capacity.		
Methods of placing the equipment in workshops and departments.		
Bibliography 1. Cândea, D., Abrudan, I., *Organizarea şi conducerea întreprinderilor industriale,* Litografia Institutului Politehnic, Cluj-Napoca, 1984. 2. Abrudan, I. şi Cândea, D., - coordonatori, Lungu, F., ş.a. *Manual de inginerie economică. Ingineria şi managementul sistemelor de producţie*, Editura Dacia, Cluj-Napoca, 2002. 3. Abrudan, I., Lungu, F., *Sisteme de stocuri şi capacitatea de producţie.* Teste grilă. Editura Todesco, Cluj-Napoca, 2006		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Built up skills are required for the employees who will work in the planning, management and exploitation of the manufacturing processes and systems.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Solving/providing answers for 18 applications/ theory questions	Written examination - 1.5-2 hours for the assessment	80%
10.5 Applications	Mandatory presence. Practical test.	Written test.	20%
10.6 Minimum standard of performance			
Right answer to 9 questions/applications. Mark to the practical part ≥ 5			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Şef lucr.dr.ing. Călin Ciprian Oţel	
	Teachers in charge of application	Şef lucr.dr.ing. Gabriela Băcilă	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	65.10

2. Data about the subject

2.1	Subject name	Optimization of Technological Processes					
2.2	Subject area	Mathematics					
2.3	Course responsible/lecturer	Prof.Dr.Eng. Ancau Mircea - mircea.ancau@tcm.utcluj.ro					
2.4	Teachers in charge of seminars	Prof.Dr.Eng. Ancau Mircea - mircea.ancau@tcm.utcluj.ro					
2.5 Year of study	4	2.6 Semester	2	2.7 Assessment	Coll.	2.8 Subject category	DS/DOP

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	28	3.5 of which, course:	14	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	12
Supplementary study in the library, online and in the field	10
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	10
Exams and tests	8
Other activities	-

3.7	Total hours of individual study	50
3.8	Total hours per semester	78
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Mathematical analysis, algebra, analytic geometry, computer programming
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	Projector multi-media, blackboard

5.2	For the applications	Personal computer, C++ compiler, Matlab

6. Specific competences

Professional competences	**C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology. **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. **C4.3.** Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. **C4.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. **C4.5.** Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To obtain knowledge concerning numerical optimization methods.
7.2	Specific objectives	To know optimization methods to solve linear or nonlinear optimization models, wihout/with constraints; To know how to design a mathematical model for optimization; To know heuristic algorithms for solving combinatorial optimization problems.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
GENERALITIES Introduction. Basic concepts. General mathematical model. Iterative optimization.	Exposing, problem solving	Computer, video-projector
GENERALITIES The existence and uniqueness of optimal solution. The existence and uniqueness of optimal solution in the absence of constraints. The existence and uniqueness of optimal solution in the presence of constraints.		
THE OPTIMIZATION OF ONE VARIABLE UNCONSTRAINED PROBLEMS Introduction. Fibonacci's method. Golden section method. Polynomial approximation method.		
THE OPTIMIZATION OF ONE VARIABLE UNCONSTRAINED PROBLEMS Cubical optimization. General algorithm for optimizaton. One variable constrained problems optimization. Strategy for optimum calculation.		
N VARIABLE UNCONSTRAINED PROBLEMS OPTIMIZATION		

Introduction. Unconstrained optimization methods. General optimization method.		
N VARIABLE UNCONSTRAINED PROBLEMS OPTIMIZATION Zero order methods. Relaxation method. First order methods. Gradient method.		
N VARIABLE UNCONSTRAINED PROBLEMS OPTIMIZATION Conjugate gradient method. Second order method. Convergence criteria. Maximum number of iteration. Absolute and relative difference of objective-function value. Zero-value of the objective-function gradient.		
N VARIABLE CONSTRAINED PROBLEMS OPTIMIZATION Introduction. Exterior penalty method. Interior penalty method.		
N VARIABLE CONSTRAINED PROBLEMS OPTIMIZATION Extended interior penalty method. Augmented Lagrange multiplier method.		
MULTICRITERIAL OPTIMIZATION Introduction. Problem of Pareto. Basics of multicriteria optimizatin. Ordering method. Ideal levels method. Global criterion method. Mini-Max method.		
COMBINATORIAL OPTIMIZATION Introduction; Traveling Salesman Problem. The calculation of the minimum length path.		
COMBINATORIAL OPTIMIZATION Johnson's algorithm. The calculation of the optimal flowshop schedule.		
COMBINATORIAL OPTIMIZATION Minkowski sums. Problems for optimal nesting. Case of convexe profiles.		
COMBINATORIAL OPTIMIZATION Problems for optimal nesting. Case of concave profiles.		

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Ancău, M., Nistor, L. *Tehnici numerice de optimizare în proiectarea asistată de calculator*. Editura Tehnică, Bucureşti, 1996.
Ancău, M. *Optimizarea proceselor tehnologice*. UTPres, Cluj-Napoca, 1999.
Ancău, M. *Optimizare numerica. Algoritmi şi programe în C*, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2005.
Press, W., et al. *Numerical Recipes in C*, Cambridge university Press, 1992.

8.2. Applications/Seminars	Teaching methods	Notes
Global optimization using Monte-Carlo method.	Plan of laboratory session	Individually or group solving of laboratory themes, under the supevision of a teacher
Dynamic optimization of a set of activities.		
Drills path length minimization in PCB drilling.		
The calculation of Pareto-optimal set in multicriteria optimization.		
Optimal nesting; case of rectangular profiles.		
Optimal nesting; case of polygonal profiles.		
The calculation of optimal flowshop schedule, using the algorithm of Johnson.		

Bibliography

Ancău, M., Nistor, L. *Tehnici numerice de optimizare în proiectarea asistată de calculator*. Editura Tehnică, Bucureşti, 1996.
Ancău, M. *Optimizarea proceselor tehnologice*. UTPres, Cluj-Napoca, 1999.
Ancău, M. *Optimizare numerica. Algoritmi şi programe în C*, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2005.
Press, W., et al. *Numerical Recipes in C*, Cambridge university Press, 1992.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The acquired competences are necessary to make semester or year projects, diploma project, and later on, to solve different practical problems in future industry production.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Solve two theoretical subjects and a problem	Writing – duration 1.5 – 2 hours	75%
10.5 Applications	Solve an application in MathCAD	Writing – duration 1.5 – 2 hours	25%
10.6 Minimum standard of performance			
The final credit can be received only if each of the mark's components is fulfilled: The solving of each of the three subjects (2 theoretical + 1 problem) by minimum of 5 score.			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Prof.Dr.Eng. Mircea Ancău	
	Teachers in charge of application	Prof.Dr.Eng. Mircea Ancău	

Date of approval in the department IF ________________________	Head of department Lect.dr.ing. Adrian Trif
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	65.20

2. Data about the subject

2.1	Subject name			Cryogenic Technologies			
2.2	Subject area			Cold technique			
2.3	Course responsible/lecturer			Prof.dr.ing. Hancu Liana- Liana.Hancu@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Sl.dr.ing. Popescu Adrian- Adrian.Popescu@tcm.utcluj.ro			
2.5 Year of study	IV	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DS/DOP

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	28	3.5 of which, course:	14	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	28
Supplementary study in the library, online and in the field	14
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	6
Tutoring	2
Exams and tests	2
Other activities	

3.7	Total hours of individual study	52
3.8	Total hours per semester	80
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Material study, Technical drawing, Physics, Mechanics, Thermotechnics
4.2	Competence	Graphic design

5. Requirements (where appropriate)

5.1	For the course	Multimedia projector and blackboard.
5.2	For the applications	Laboratory equipment

6. Specific competences

Professional competences	C4.1. Describing the theory, methods and basic principles for designing the processes specific to machine building technology. C4.2. Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. C4.3. Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. C4.4. Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. C4.5. Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs
Cross competences	

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To assimilate fundamental knowledge concerning cryogenic temperatures and the technologies that can use it.
7.2	Specific objectives	To know cryogenic equipments' peculiar elements To learn the thermal calculus of the cryogenic equipments To understand the behavior of materials in cryogenic conditions To design cryogenic technologies of any type

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1.Material behavior at cryogenic temperatures. Introduction, principles, bibliography, specific terminology, objectives, background and applications. Thermal, electrical and mechanical behavior	Oral presentation, notes on blackboard and multimedia presentation	Students are encouraged to ask questions
2.Materials' mechanical and technological characteristics at cryogenic temperatures. Methods, equipment and specific devices for determination.		
3.Cryogenic equipments. Different types, characteristics, design, materials, feed and drain cook, thermometers, safety devices, pipes.		
4.Calculus of the necessary quantity of the cryogenic fluid. thermal insulation., heat transfer		
5.Cryogenic technologies, sheet forming technologies, cryogenic cutting, punching and deep drawing, equipment, technological parameters, practical applications.		
6.Assembling technologies and cryogenic chipping. Types, equipment, applications and technological parameters.		

7.Parts grinding, and materials recovery and recycling in cryogenic conditions. Types, equipment, applications and technological parameters.		
Bibliography 1. Tăpălagă, I., ş.a., Criogenia în construcţia de maşini. Editura Dacia, Cluj-Napoca,1988 2. Stamatescu,C., Criogenie tehnică. Ed.Tehnică, Bucureşti, 1982 3. Hancu Liana- Power Point Presentation		
8.2. Applications/Seminars	Teaching methods	Notes
1.Cryogenic equipments design and manufacture	Practical work in the laboratory.	Students are asked and encouraged to ask questions
2.Cryogenic temperatures influence upon mechanical characteristics of the materials through traction testing		
3.Cryogenic temperatures influence upon mechanical characteristics of the materials through bending testing		
4.Cryogenic temperatures influence upon mechanical characteristics of the materials through resilience testing		
5.Cryogenic temperatures influence upon friction		
6.Peculiarities in equipment design for cryogenic fluid" transportation		
7.Determination of the nitrogen fluid quantity necessary for different types of equipments. Case studies.		
Bibliography 1. Hancu, L., Iancău,H., Achimaş, G., Criogenie şi maşini frigorifice. Îndrumător pentru lucrări de laborator, Editura ALMA MATER, 2003, 104 pagini, ISBN 973-8397-33-2		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

New technologies are now on the market and Cryogenics is one domain that is on the bases of this development. New products need new technologies and the factories can stay on the market only if are taking into consideration this new technologies.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The ability to answer to theoretical questions and to solve practical problems (mark T)	Written test	T is 80%
10.5 Applications	The presence is compulsory (100%). The activity during classes is appreciated (mark L)	Questions on each class	20%
10.6 Minimum standard of performance			
Final mark: N=T+L>5; (T>5 and L>5)			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof. eng. Liana HANCU, PhD	
	Teachers in charge of application	S.L. eng. Adrian POPESCU, PhD	

Date of approval in the department IF ________________________	Head of department S.L.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	65.30

2. Data about the subject

2.1	Subject name	Wood Processing Tools
2.2	Subject area	Manufacturing Engineering
2.3	Course responsible/lecturer	Lecturer dr. eng. Trif Adrian, adrian.trif@tcm.utcluj.ro
2.4	Teachers in charge of seminars	Lecturer dr. eng. Trif Adrian, adrian.trif@tcm.utcluj.ro

2.5 Year of study	4	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DS-DOP

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	28	3.5 of which, course:	14	3.6 applications:	14

Individual study	Hours
Manual, lecture material and notes, bibliography	28
Supplementary study in the library, online and in the field	8
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	14
Tutoring	
Exams and tests	2
Other activities	

3.7	Total hours of individual study	52
3.8	Total hours per semester	80
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1 Curriculum	Descriptive geometry and technical drawing; Cutting tools technologies
4.2 Competence	-to know the principles of geometry; optimal choice of cutting tools for industry; -to understand design principles and the choice of cutting tools dependi conditions; -to evaluate the performance of cutting tools from different classes and categories of tools; -to synthesize practical methods of measurement , sharpening and setting geometry to achieve proper control of cutting tools and effective deployment of cutting process.

5. Requirements (where appropriate)

5.1. For the course	Multimedia projector
5.2. For the applications	Laboratory equipment

6. Competenţele specifice acumulate

Professional competences	- Describing the theory, methods and basic principles for designing the processes specific to machine building technology. - Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology . - Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. - Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. - Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technoloqies , includinq specific CAM programs
Cross competences	-Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. -Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of lanquaqe skills and knowledqe of information technology and communication ..

7. Discipline objectives (as results from the *key competences gained*))

7.1 General objective	-to use universal and specialized microscopes to measure linear and angular dimensions of cutting tools; -to use universal and specialized measuring instruments for measuring linear and angular dimensions dim of cutting tools; -to analyze the data from measurement and compare them with those requirements.
7.2 Specific objectives	-to determine the correct type of cutting tool used in cutting; -to select the optimal cutting edge geometry depending on the type of concrete cutting tool and cutting conditions ; -analyze the data from measurement and compare them with those requirements; -to use the computer to design cutting tools

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1.Wood cutting. Elements of wood cutting. - General. Wood structure. Physical properties; - Presenting the wood processing; - Presentation of cutting parameters; - Geometry of chip and knife.	Exposure, tnotes, and multimedia presentation	Multimedia projector
2. Wood Processing Tools - Presentation of the main types of tools used in woodworking area		
3. Cutting wood with toothed blades - Geometry of blades; - Cutting wood with saw logs;		

- Wood cutting band saw; Cutting wood with circular saw.		
4. Wood milling - The elements of milling process; - Types of mills and their construction ; Wood Milling copyinq..		
5. Wood drilling - Characteristics of wood drilling; - Types of drill bits for wood; Geometry of drill bits for wood.		
6. Wood turning - Methods of wood turning; - Geometry of turning tools; Optimal parameters in wood turning		
7. Flat cutting wood. wood sanding - Influence of blade geometry on surface quality; Overview of tools for wood sanding and polishinq.		
8.2. Applications/Seminars	Teaching methods	Notes
1.Measuring linear and angular dimensions of woodworking tools using universal microscope	In the activities will be used both classical teaching methods and modern means, using an interactive teaching style teacher-student. For the preparation of papers and studies, consultations and regular meetings with students will be provided by mutual agreement. There will be a study trip to a professional company.	
2.Measurement of constructive and geometrical parameters of toothed blades for woodworking		
3.Measurement of woodworkinq millinq tools parameters .		
4. Measurement of woodworking drilling tools parameters.		
5. Measurement of woodworking turning tools parameters.		
6. Documentary trip in a wood processing company (SORTILEMN GHERLA)		
7. Laboratory evaluation of the work activity.		

1. Abrudan, G. ş.a., *Proiectarea sculelor aşchietoare*, Litografia IPC-N, 1982
2. Bădescu L. *Dispozitive pentru industria lemnului*, Editura Lux Libris, Braşov, 1999.
3. Borzan, M., *Proiectarea sculelor profilate*. Editura Studium, Cluj-Napoca, 2001.
4. Dogaru, V. *Aşchierea lemnului şi scule aşchietoare*, Ed. Tehnică, Bucureşti, 1977.
5. Dogaru V. *Dispozitive moderne pentru prelucrarea lemnului*, Editura Tehnică, Bucureşti, 1979.
6. Dogaru, V. *Intreţinerea şi exploatarea sculelor tăietoare pentru prelucrarea lemnului ,* Bucureşti, Editura Tehnică, 1981.
7. Dogaru, V. *Bazele aşchierii lemnului şi a materialelor lemnoase*, Bucureşti, Editura Tehnică, 1985.
8. Dogaru, V. – *Frezarea lemnului* – Braşov, Editura Universităţii Transilvania Braşov, 2003.
9. Năstase V. *Tehnologia fabricării mobilei*, Reprografia Universităţii din Braşov, 1981.
10. Oprea,I. Sbera,I., *Tehnologia exploatarii lemnului*, vol.I: Elemente de baza si tehnici procesuale, Ed.Universitatii Transilvania Brasov, 2000
11. Oprea,I. Sbera,I., *Tehnologia exploatarii lemnului*, vol.II: Elemente de baza si tehnici procesuale, Ed.Universitatii Transilvania Brasov, 2000
12. Râmbu I. *Tehnologia prelucrării lemnului* (vol I, vol II), Editura Didactică şi Pedagogică, Bucureşti, 1982.
13. Tăran, N. *Scule şi maşini moderne pentru frezarea lemnului,* Bucureşti, Editura Tehnică, 1983.
14. Zlate, Ghe., Brendörfer, D., *Bazele producţiei şi prelucrării mecanice a lemnului* Bucureşti, Editura CERES, 1990.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The knowledge gained after the course will be a starting point for the professional development of future engineers, especially those who will be employed in woodworking enterprises.

10. Evaluare

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The ability to answer to theoretical questions and to solve practical problems	Colloquium consists of a test (2 hours) - T; Topics (case studies) is corrected and will be noted if the notes are delivered to deadlines. - s	T= 60% S=30%
10.5 Applications	The presence is compulsory The activity during classes is appreciated	Questions on each class (5 questions)	L=10%
10.6 Minimum standard of performance : N =T + S + L;			
The final credit can be received only if each of the mark's components is fulfilled: T>5; S>5; L>5			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Adrian TRIF	
	Teachers in charge of application	Adrian TRIF	

Date of approval in the department IF ________________________	Head of department Lecturer.dr.eng. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data related to the programme of study

1.1	Institution	Technical University of Clui-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturinq Enqineerinq
1.4	Field of Study	Industrial Engineering
1.5	Study Level	Bachelor of Science
1.6	Programme of study/Qualification	Manufacturinq Enqineerinq / Enqineer (TCM}
1.7	Full or part time (Type of attendance)	IF-Full time attendance
1.8	Subject code	66.10

2. Data related to the subject

2.1 Subject name	Logistics						
2.2 Subject area	Logistics						
2.3 Course responsible	Lecturer dr. eng. Trif Adrian, adrian.trif@tcm.utcluj.ro						
2.4 Seminar/lab classes/project in charqe of	Lecturer dr. eng. Trif Adrian, adrian.trif@tcm.utcluj.ro						
2.5 Year of study	4	2.6 Semestrul	2	2.7 Assessment	Coll	2.8 Subject category	DS/DOP

3. Total estimated time

3.1 No. of hours per week	2	of which: 3.2 lecture	1	3.3 Applications	1
3.4 Total no. of hours in the curriculum	28	of which: 3.5 lecture	14	3.6 Applications	14

Individual study	Hours
Learning from manuals, course notes, biblioqraphy	28
Additional reading and documentation in libraries, electronic platforms and field	7
Preparation of seminars/lab classes, assiqnments, reports, portfolios, essays	10
Tutorial classes	
Exams and tests	5
Other activities	

3.7 Total no. of hours of individual study	50
3.8 Total no. of hours per semester	78
3.9 No. of credit points	3

4. Pre-requisites (where necessary)

4.1 of curriculum	Use of computing equipment and testing methods used in addressing resources
4.2 of competences	Knowledge in management and marketing to achieve specific goals

5. Requisites (where necessary)

5.1. To run the courses/lectures	classroom with PC stations and video projector
5.2. To run the applications	classroom with PC stations and video projector

6. Specific competences

Professional skills	-Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. -Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. -Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology - Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. -Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Transversal skills	-Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. -Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of lanquaqe skills and knowledQe of information technoloav and communication ..

7. Subject objectives (according to the specific competences)

7.1 General subject objective	1. To know all the organizational activities necessary to develop supply chain 2. Understand the need for a link between strategy and logistics company 3. To assess the strategic management of procurement, movement and storage of materials, semi / finished product and information flows of these processes 4. Summarizing the conditions necessary to conduct an efficient distribution process
7.2 Specific objectives	After going through the course students will be able to: 1. To know the role of logistics in a company, the logistics and relationships that take place in the supply chain, analyzing and finding solutions to major problems related to logistics 2. Need to understand the formation of strategic alliances for production and supply 3. Help reduce costs and maximize the degree of utilization of assets by streamlining and coordination of production facilities 4. To know the methods of storage and transport of goods through distribution channels 5. To use the advantages of information technology to improve services to customers

8. Conţinuturi

8.1 Lecture (syllabus)	Metode de predare	Observaţii
1. Purpose and logistical resources activity. Strategic Issues. The role and the principles of logistics.	Expunere, notite pe tablă şi prezentare multimedia	Proiector multi-media
2. Planning of logistical activities. Logistic systems. Logistic's connections with marketing and production.		
3. Distribution channels. Reverse logistics as a new distribution structure.		
4. Logistics infrastructure design. Logistics infrastructure management.		
5. Materials handling and storage of goods. Management and inventory control.		
6. The management of vehicles. Freight transport logistics and equipment		
7. Human resources factor in loqistics		
Bibliography		

1. [BOR98] Borzan M., Borzan C., Mocean F., *Elemente de asigurarea şi managementul calităţii.* Editura Studium, ISBN 973-9422-91-6, Cluj-Napoca, 2001.
2. [BOR08] Borzan M., *Elemente de logistică şi distribuţie.* Notiţe de curs pentru secţiile de studii aprofundate. UTCN, 2002-2008.
3. [GAT01] Gattorna J., *Managementul logisticii şi distribuţiei*. Editura Teora, Bucureşti, 2001.
4. [RIS96] Ristea A.L., Purcarea T., *Distribuţia mărfurilor.* EDP, Bucureşti, 1996.
5. [Bal06] Balan C., *Logistica*. Ed. URANUS, Editia a III-a. Bucuresti, 2006.
6. [TRI17] Trif, A. *Logistica industriala*, Notiţe de curs pentru studenti si masteranzi, UTCN 2017

8.2 Lab classes (room) E117	Teaching methods	Notes
1.Planning and simulation of distribution system		
2.Planning and optimizing the flow of raw materials and materials		
3.The Planninq Partnership. Types of cooperation		
4.Optimizinq systems for transport and storage of goods		
5.Reverse Logistics Systems		
6.Improvinq loqistics function based on human resource manaqement		
7. Evaluation of accumulated knowledge and granting qualification		

Bibliography:

1. [TRI17] Trif, A., Indrumator de lucrari logistica, UTCN 2019
2. WinQSB – software tutorial

9. Relationship between subject content and expectations of professional community, professional associations and emplo ers in the field of the study programme

The knowledge gained in industrial logistics and marketing is a starting point for the professional development of future engineers, especially those who will be employed in the logistics departments of enterprises.

10. Evaluare

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weigh in the final mark
10.4 Lecture	The colloquium consists of two stages: 1. Grid test with 10 questions 1. 2. Each student will make a PPS presentation with a logistic analysis specific to an enterprise of their choice	1.Grid test (30 min) 2. Presentation (6 hours)	1. 30% 2. 50%
10.5 Seminar/ Laborator	Solving a Problem (based on the applications discussed in laboratory work)	The test performed on the computer (30 min)	20%
10.6 Minimum performance standard			
Written Exam (N_E), Presentation (N_P), Application Solving (N_{apl}). $N = 0,3\ N_E + 0,5\ N_P + 0,2\ N_{apl}$ Minimum standard: $N \geq 5$, $N_E \geq 5$, $N_P \geq 5$, $N_{apl} \geq 5$			

Date of filling in:		Title Surname Name	Signature
dd.mm.yyyy	Lecturer	Lecturer dr. eng. Trif Adrian	
	Teachers in charge of application	Lecturer dr. eng. Trif Adrian	

Date of approval in the department IF ________________________	Head of department Sl.dr.ing. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	66.20

2. Data about the subject

2.1	Subject name			**CNC Programming**			
2.2	Subject area			Technical information			
2.3	Course responsible/lecturer			Reader PhD. Eng. Carean Alexandru alexandru.carean@tcm.utcluj.ro			
2.4	Teachers in charge of seminars			Lecturer PhD. Eng. Ioan Alexandru POPAN, Ioan.popan@tcm.utcluj.ro			
2.5 Year of study	IV	2.6 Semester	2	2.7 Assessment	Coll.	2.8 Subject category	OS/DS

3. Estimated total time

3.1 Number of hours per week	2	3.2 of which, course:	1	3.3 applications:	1
3.4 Total hours in the curriculum	28	3.5 of which, course:	14	3.6 applications:	14

Individual study	hours
Manual, lecture material and notes, bibliography	15
Supplementary study in the library, online and in the field	12
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	10
Exams and tests	3
Other activities	

3.7	Total hours of individual study	50
3.8	Total hours per semester	78
3.9	Number of credit points	3

4. Pre-requisites

4.1	Curriculum	Descriptive Geometry and Technical Drawing, Materials, Machine Tools, Cutting Tools
4.2	Competence	C2.5. Specific professional development of industrial engineering projects based selection, combination and use of knowledge, principles and methods

5. Requirements

5.1	For the course	Projector multi-media, blackboard
5.2	For the applications	Equipment from the laboratory “CNC Technologies”

6. Specific competences

Professional competences	**C3.1.** Describing the basic theories and methods in the field of computer programming and applied informatics specific to machine building technology. **C3.2.** Using the basic knowledge associated to software programs and digital technologies for explaining and interpreting the issues of conceive and computer aided design of products, processes and technologies, in experimental and theoretical investigation of computerized data processing, specific to industrial engineering in general, and particularly in machine building technology. **C3.3.** Applying basic principles and methods of software programs and digital technologies for programming, database implementation, assisted graphics, modeling, computer aided design of products, processes and technologies, investigation and computerized data processing specific to industrial engineering in general, and particularly to machine building technology. **C3.4.** Appropriate use of standard assessment criteria and methods to assess the quality, advantages and limitations of software programs and digital technology in order to be used in specific tasks of industrial engineering in general, and particularly machine building technology. **C3.5.** Elaboration of the professional projects specific to industrial engineering, in general and to machine building technology, in particular, on the basis of selection, combination and use of principles, methods, digital technologies, information systems and software tools dedicated to the field. **C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology. **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. **C4.3.** Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. **C4.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. **C4.5.** Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication..

7. Discipline objectives

7.1	General objective	Developing skills in the field of cutting processing technologies on CNC machine tools (CNC programming and operating)
7.2	Specific objectives	1. Learning advanced knowledge about CNC machine tools programming (machining and turning centers) 2. Learning how to setup CNC machine tools (setting work piece zero and the tool length and radius offset)

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Advanced programming functions for modern CNC equipments: FANUC (HAAS), SINUMERIK and HEIDENHAIN.	Oral presentation, notes on blackboard	Students are encouraged to
2. Multiple tool compensation at machining centers		

3. Multiple tool compensation at turning centers.	and multimedia presentation	ask questions
4. CNC programming possibilities using subprograms.		
5. General considerations on drilling and milling cycles used in machining centers.		
6. Basic and specific aspects in programming a drilling cycle. Types of drilling cycles.		
7. Elaboration of CNC programs using CNC subprograms and drilling cycles.		

Bibliography
1. Cărean, Al., si Popan I. Al., Programarea şi operarea centrelor de prelucrare CNC, Editura U.T.PRESS, Cluj-Napoca, 2015.
2. Cărean, Al., Tehnologii de prelucrare cu CNC, Editura Dacia, Cluj – Napoca, 2002.
3. Damian, M., Cărean, Al., ş. a., Fabricaţie asistată de calculator. Cluj-Napoca, Casa Cărţii de Ştiinţă, 2003.
4. Roş, O. şi Carean, Al., Tehnologia prelucrării pe maşini-unelte cu comandă numerică, Editura Dacia, Cluj – Napoca, 1995.

8.2. Applications/Seminars	Teaching methods	Notes
1. Work safety at the operation of MUCNs. Presentation of MUCNs from NAPOMAR Cluj-Napoca.	The students are training to setup CNC turning centers and turning centers. Practical execution of the parts on the HAAS VF-2SS machining center and the Lynx 220-FANUC CNC lathe.	Students are encouraged to ask questions
2. Analysis of the similarities and differences in the operating modes of the CNC equipment in the TCM laboratory.		
3. Multiple tool compensation study for CNC machining centers. Case study.		
4. Multiple tool compensation study for CNC lathe operation. Case study.		
5. Operation of processing centers in the case of CNC subprograms. Case study.		
6. Study of HAAS drilling cycles. Case study.		
7. Analysis of processing time in the context of rapid feed and work feed operations at machining centers and CNC lathes. Case study.		

Bibliography
1. Cărean, Al. si Popan, I. Al., Programarea şi operarea centrelor de prelucrare CNC, Editura U.T.PRESS, Cluj-Napoca, 2015.
2. Manual de operare si programare FANUC-Oi-TB;
3. Manual de operare si programare HAAS.

2. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The professional skills in the advanced manufacturing technologies on CNC machining and turning center, gained during the course, are in line with the employer's expectations.

3. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The ability to answer to theoretical questions and to solve practical problems	Written test (mark T)	T is 75%

10.5 Applications	The presence is compulsory (100%). The activity during classes is appreciated	Questions on each class (mark A)	A is 25%
10.6 Minimum standard of performance N =T + A			
The final credit can be received only if each of the mark's components is fulfilled: N≥5; T≥5; A≥5			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Reader PhD. Eng.Carean Alexandru	
	Teachers in charge of application	Lecturer PhD. Eng. Ioan Alexandru POPAN	

Date of approval in the department IF ________________________	Head of department Lecturer PhD. Eng. Adrian TRIF
Date of approval in the faculty CM ________________________	Dean Prof.dr.ing. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*67.00*

2. Data about the subject

2.1	Subject name	Research and Design Activities					
2.2	Subject area	Manufacturing eng.					
2.3	Course responsible/lecturer	Prof.Eng. Hancu Liana, PhD; Liana.Hancu@tcm.utcluj.ro					
2.4	Teachers in charge of seminars						
2.5 Year of study	IV	2.6 Semester	2	2.7 Assessment	Test	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	8	3.2 of which, course:	0	3.3 applications:	8
3.4 Total hours in the curriculum	112	3.5 of which, course:	0	3.6 applications:	112

Individual study	hours
Manual, lecture material and notes, bibliography	40
Supplementary study in the library, online and in the field	40
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	8
Tutoring	
Exams and tests	
Other activities	

3.7	Total hours of individual study	88
3.8	Total hours per semester	200
3.9	Number of credit points	7

4. Pre-requisites (where appropriate)

4.1	Curriculum	All the courses from the curricula should be promoted
4.2	Competence	All the competences should be fulfilled

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

6. **Specific competences**

Professional competences	**C4.1.** Describing the theory, methods and basic principles for designing the processes specific to machine building technology**.** **C4.2.** Using the basic knowledge for explaining and interpreting of the various types of manufacturing processes specific to machine building technology. **C4.3.** Applying basic principles and methods for designing the manufacturing processes on classical machines and/or CNC with well-defined inputs, under qualified assistance. **C4.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of manufacturing processes on classical machines and/or CNC and the flexible manufacturing systems. **C4.5.** Elaborating the professional projects of the manufacturing technological processes specific for manufacturing technologies, including specific CAM programs **C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT2.** Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. **Discipline objectives (as results from the *key competences gained*)**

7.1	General objective	To elaborate a Bachelor Theses
7.2	Specific objectives	To make all the steps that are necessary to elaborate a Bachelor Theses

8. **Contents**

8.1 Research and Design Activities	Teaching methods	Notes
Establishment of the theme for the Bachelor diploma		
Establishment of the content of the Bachelor research		
Establishment of the program of the Bachelor research		
Documentation in the library, internet, department etc.		
Analyse of the data and realization of the first chapter considering all the knowledge in the field		
Numerical research for the theoretical part of the work		

Experimental research for the practical part of the work		
Processing the data from the experimental work		
Economical and managerial aspects		
Realization of the design part of the work		
Preparing a paper with the theoretical and practical research and with the graphical design for presentation		
Bibliography Bibliography is specific to each student considering the subject of the Bachelor thesis		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The subject for the Bachelor diploma is recommended to be proposed by the possible employers with the activity in the field of the study programme.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course			
10.5 Applications	C=mark for the content of the final theses (is given by the scientific advisor); T=mark for the aspect and presentation,	Oral presentation	N=0,75C+0,25T
10.6 Minimum standard of performance			
The final credit can be received only if each of the mark's components is fulfilled: N=0,75C+0,25T; Condition: N>5; C>6.			

Date of filling in:		Title Surname Name	Signature
	Lecturer		
	Teachers in charge of application	Prof.Eng. Hancu Liana PhD	

Date of approval in the department IF ________________________	Head of department SL.Eng. Trif Adrian PhD.
Date of approval in the faculty CM ________________________	Dean Prof.dr.eng. Corina BÎRLEANU

SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Industrial Engineering, Robotics and Production Management
1.3	Department	Manufacturing Engineering
1.4	Field of study	Industrial Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Manufacturing Engineering/engineer
1.7	Form of education	Full time
1.8	Subject code	*68.00*

2. Data about the subject

2.1	Subject name			Practical Work for Bachelor Diploma			
2.2	Subject area			Manufacturing eng.			
2.3	Course responsible/lecturer			Prof.Eng. Liana Hancu PhD- Liana.Hancu@tcm.utcluj.ro			
2.4	Teachers in charge of seminars						
2.5 Year of study	IV	2.6 Semester	2	2.7 Assessment	Test	2.8 Subject category	DS/DOB

3. Estimated total time

3.1 Number of hours per week	30	3.2 of which, course:	0	3.3 applications:	30
3.4 Total hours in the curriculum	60	3.5 of which, course:	0	3.6 applications:	60

Individual study	hours
Manual, lecture material and notes, bibliography	
Supplementary study in the library, online and in the field	
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	
Tutoring	
Exams and tests	
Other activities	

3.7	Total hours of individual study	
3.8	Total hours per semester	60
3.9	Number of credit points	3

4. Pre-requisites (where appropriate)

4.1	Curriculum	All the courses from the curricula should be promoted
4.2	Competence	All the competences should be fulfilled

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	

6. Specific competences

Professional competences	**C5.1.** Defining the concepts, theories, methods and basic principles of designing the manufacturing equipment, their components and the industrial logistics specific to machine building technology. **C5.2.** Using basic knowledge to explain and interpret different types of technological equipment and their components specific to the machine building technology. **C5.3.** Applying basic principles and methods for designing the manufacturing equipment and their components specific to the machine building technology **C5.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, advantages and limitations of the manufacturing equipment and / or their components specific to the machine building technology. **C5.5.** Elaborating professional projects for manufacturing equipment specific to the machine building technology. **C6.1.** Defining the concepts, theories, methods and basic principles for planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment **C6.2.** Using the basic knowledge for explanation and interpretation the issues that arise in planning, management and usage of the manufacturing processes and systems on classic machines and/or CNC as well as in quality assurance and product ascertainment. **C6.3.** Applying of basic principles and methods for planning, management and usage of manufacturing processes and systems, as well as for quality assurance and product ascertainment, under qualified assistance. **C6.4.** Proper use of standard evaluation criteria and methods to appreciate the quality, the advantages and the limits of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product ascertainment including dedicated software **C6.5.** Elaborating professional projects by using the principles and methods established in the field of planning, management and usage of the manufacturing processes and systems, as well as quality assurance and product inspection.
Cross competences	**CT1.** Applying the values and the ethics of the profession of engineer and the responsible execution of the professional duties under limited autonomy and qualified assistance. Promoting the logical reasoning, convergent and divergent, the practical applicability and the assessment and self-evaluation decisions. **CT2.** Achieving the activities and exercise teamwork at different hierarchical levels. Promoting a spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of its work. **CT3.** Objective self-evaluation of the need of continuous training for labor market insertion and the accommodation to its dynamic requirements and for personal and professional development. Effective use of language skills and knowledge of information technology and communication.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To follow all the steps that are necessary to make the practical part of the Bachelor Theses
7.2	Specific objectives	To perform a practical experiment

8. Contents

8.1 Practical Work for Bachelor Diploma	Teaching methods	Notes
Establishment of the experiments' programme		
Preparation of the equipment for the experiments		
Preparation of the devices for the experiments		
Preparation of the materials for the experiments		
Experimental research for the practical part of the work for Bachelor theses		

Processing the data from the experimental work		
Preparing a paper with the theoretical and practical research and with the graphical design for presentation		
Bibliography Bibliography is specific to each student considering the subject of the Bachelor thesis.		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The subject for the bachelor diploma is recommended to be proposed in a professional way by the possible employers with the activity in the field of the study programme.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course			
10.5 Applications	mark for practical (C) and theoretical work (T)	Oral presentation	0,75C 0,25T
10.6 Minimum standard of performance			
The final credit can be received only if each of the mark's components is fulfilled: N=0,75C+0,25T; Condition: N>5; C>6.			

Date of filling in:		Title Surname Name	Signature
	Lecturer		
	Teachers in charge of application	Prof.Eng. Hancu Liana PhD	

Date of approval in the department IF ________________________	Head of department SL.Eng. Trif Adrian, PhD.
Date of approval in the faculty CM ________________________	Dean Prof.Eng Corina Bîrleanu, PhD .