COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	"Transilvania" University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Engineering science/Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Engineering Sciences / Mechanical Engineering Practical integrated methods for propulsion systems engineering

2. Data about the course

2.1 Name of course			Measurement Techniques used in Manufacturing and Quality Assurance					
2.2 Course convenor			Associate Prof. PhD, dipl. Eng. MIHAIL Laurențiu - Aurel					
2.3 Seminar/ laboratory/ project convenor			Associate Prof. PhD, dipl. Eng. MIHAIL Laurențiu - Aurel					
2.4 Study year	I	2.5 Semester	I	2.6 Evaluation type	E	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**2**	out of which: 3.2 lecture	**1**	3.3 seminar/ laboratory/ project	**0 /1/ 0**
3.4 Total number of hours in the curriculum	**28**	out of which: 3.5 lecture	**14**	3.6 seminar/ laboratory/ project	0/14/0

Time allocation	hours
Study of textbooks, course support, bibliography and notes	20
Additional documentation in libraries, specialized electronic platforms, and field research	30
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	20
Tutorial	10
Examinations	3
Other activities.....	0

3.7 Total number of hours of student activity	**83**
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	**5**

4. Prerequisites (if applicable)

4.1 curriculum-related	• Technical Drawing interpretation (GD&T)
4.2 competences-related	• Engineering (Mechanical, Manufacturing, etc.)

5. Conditions (if applicable)

5.1 for course development	• Video projector
5.2 for seminar/laboratory/project development	• Access at the ICDT L3 Mitutoyo dimensional metrology laboratory inventory

6. Specific competences and learning outcomes

Professional competences	C3. Coordination of the quality management system and project management L.O.3.1. The graduate can plan, coordinate and direct all production activities in order to ensure product quality; L.O.3.2. The graduate can carry out activities related to quality control by performing inspections and tests of services, processes or products;

Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. CT2. Autonomy and critical thinking L.O.2.1 The graduate develops his own way of solving a task, working motivated, with little or no supervision. L.O.2.2 The graduate has autonomy in making technical decisions or those related to the management of design activities L.O.2.3 The graduate has the ability to ensure the quality of a mechanical structure and mechanical product/system. L.O.2.4 The graduate can develop efficient and responsible work strategies, applying the principles, norms and values of the code of professional ethics. L.O.2.6 The graduate has the ability to objectively self-assess the need for lifelong training, the use of information and communication in an international language for the purpose of insertion into the labor market and continuous adaptation to its requirements. CT3. Preparing and presenting reports describing the results and processes of scientific or technical research. L.O.3.1 The graduate can write and present technical reports for the semester practice and/or for the discipline projects, going through all the necessary stages, from documentation, idea/concept, modeling/simulation to testing/validation. L.O.3.2 The graduate understands and ensures the fulfillment of the norms of ethics and academic integrity in writing reports. L.O.3.3 The graduate works independently for the purpose of scientific information and to obtain the data necessary to solve the project topics; identify own sources of documentation. L.O.3.4 The graduate has the ability for interpersonal communication, professional counseling and assuming leadership roles in the work group.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Providing the theoretical and practical body of knowledge founding the coordinate metrology and quality assurance, targeting the coordinate measuring systems (tactile, optical, laser) and the main software environments for conducting it and for quality assurance; students initiation on the use of the coordinate measuring equipment for dimensional metrology, quality assurance software for data management and inclusion it in the quality management system.
7.2 Specific objectives	• To integrate the dimensional quality assessment on quality assurance and quality management systems concepts • To review the GD&T main details, as a fundament of the dimensional metrology and quality assurance • To describe the structure and the functioning of the hardware and software coordinate measuring equipment (tactile, optical, laser) on 1, 2 and 3 dimensions measurement • To describe the role and the functioning of the hardware and software components of the measuring equipment • To interpret ones of the elements of the coordinate measuring equipment part programs • To start to perceive the role of the quality assurance within the measurement cycle and quality management • To perceive accordingly one of the quality standards regarding the quality assurance and quality management at plant and laboratory levels

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
1. Dimensional metrology	Presentment/Explanation	2h	N.A.
2. Geometrical Dimension & Tolerancing	Video – projector	2h	N.A.
3. Quality assurance and quality management	Presentment/Explanation	2h	N.A.
4. Measurement small tools and data management	Video – projector	2h	N.A.
5. Optical measurement	Presentment/Explanation	2h	N.A.
6. Profile (micro and macro) and form measurement	Video – projector	2h	N.A.
7. Dimensional coordinate measurement – Coordinate Measuring Machines's architectures, probes, auxiliaries	Presentment/Explanation	2h	N.A.
8. Dimensional coordinate measurement – software	Video – projector	2h	N.A.
9. Quality assurance with Measurlink software	Presentment/Explanation	2h	N.A.
10. Quality assurance with Q-Das software	Video – projector	2h	N.A.
11. Quality assurance with Minitab software	Presentment/Explanation	2h	N.A.
12. Dimensional scanning metrology - scanners software	Video – projector	2h	N.A.
13. Machining process online monitorization	Presentment/Explanation	2h	N.A.
14. Knowledge refreshment	Presentment	2h	N.A.

Bibliography

1. www.mitutoyo.ro
2. https://www.zeiss.com/metrology/home.html
3. http://gom.com/index.html
4. https://support.gom.com/
5. http://www.hexagonmetrology.eu
6. http://www.measurlink.com
7. http://www.q-das.com/en/
8. http://www.minitab.com/en-us/
9. http://www.bipm.org/en/about-us/
10. http://www.kistler.com
11. Metrologie in coordinate – note de curs – autor Mihail Laurentiu (Coordinate metrology – course notes – author Mihail Laurentiu)

8.2 Seminar/laboratory/project	Teaching-learning methods	Number of hours	Remarks
1. Laboratory OHSAS, general presentation, inventory	Presentment	2h	N.A.
2. Measurement small tools, Linear Height, Roughness measurement (Mitutoyo calipers, micrometers, indicators, granite plate, auxiliaries, air conditioned, laptop, Measurlink software, Mitutoyo linear height, Mitutoyo roughness measurement equipment	Presentment / Debate / Practical exercises	2h	N.A.
3. Measurement techniques - Quick Image (Quick Image, auxiliaries, air conditioned, laptop, Measurlink software)	Presentment / Debate / Practical exercises	2h	N.A.
4. Measurement techniques - CMM Euro C 544 (CMM Euro C 544, KOMEG device, auxiliaries, air conditioned, laptop, MCOSMOS software, Measurlink software)	Presentment / Debate / Practical exercises	2h	N.A.
5. Quality assurance with Measurlink - case studies (Measurlink software, laptop, Video – projector)	Presentment / Debate / Practical exercises	2h	N.A.

6. Quality assurance with Q-Das - case studies (Q-Das Software DESTRA configuration, laptop, Video – projector)	Presentment / Debate / Practical exercises	2h	N.A.
7. Online quality process monitorization with cutting force and cutting torque measurement (Kistler, Dynoware, Minitab)	Presentment / Debate / Practical exercises	2h	N.A.

Bibliography

1. QI Handbook and QIPack Help
2. LH Handbook
3. CMM Euro C 544 Handbook and MCOSMOS Help
4. www.mitutoyo.ro
5. https://www.zeiss.com/metrology/home.html
6. http://gom.com/index.html
7. https://support.gom.com/
8. http://www.hexagonmetrology.eu
9. http://www.measurlink.com
10. http://www.q-das.com/en/
11. http://www.minitab.com/en-us/
12. https://play.google.com/store/apps/details?id=de.zeiss.imt.gdt

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

The incidence of the coordinate metrology on the automotive manufacturing is a very present one within the geographic area targeted by the study programs from our university. Also, the use of the innovative measurement technologies and their software (e.g. MCOSMOS, QIPACK, CALYPSO, GOM INSPECT, PC-DMIS) and the quality assurance organized according innovative approaches (e.g. vs. IATF 16949 and automotive customer quality specific requirements), and the main software for this scope (e.g. Q-DAS, MEASURLINK, MINITAB). The knowledge of the theoretical principles on the coordinate metrology is comprehensive for any type of applications, specifics to each measurement equipment, for any type of measurement surface. The course does not have as target or intent, neither the necessary accreditation for being a substitute to one of the market learning approaches (e.g. Aukom, Eukom, Mitutoyo Information Center of Metrology, Zeiss Academy).

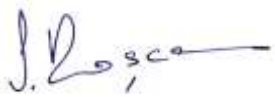
10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	The definition of the concepts quality assurance and quality management	Written exam	5 %
	Small measurement instruments	Written exam	10 %
	Profile measurement	Written exam	10 %
	Roughness measurements	Written exam	10 %
	Quality assurance software - Measurlink	Written exam	10 %
	Quality assurance software – Q-DAS	Written exam	10 %
	Quality assurance software - Minitab	Written exam	10 %
	Scanning technologies for metrology	Written exam	10 %
10.5 Seminar/ laboratory/ project	Practical application for quality assurance	Practical exam Assessment during the semester time interval	15 %

10.6 Minimal performance standard
• The identification of the main presented measurement instruments and their role • Base knowledge regarding the use and role of the main quality assurance software

This course outline was certified in the Department Board meeting on 27.09.2024 and approved in the Faculty Board meeting on 30.09.2024

Prof.dr.ing. Ioan Călin, ROȘCA



Dean

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Conf.dr.ing. Laurențiu – Aurel, MIHAIL

Course holder

Conf.dr.ing. Laurențiu – Aurel, MIHAIL

Holder of seminar/ laboratory/ project

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: FC (fundamental course) / DC (course in the study domain)/ SC (speciality course)/ CC (complementary course); for the Master level, select one of the following options: PC (proficiency course)/ SC (synthesis course)/ AC (advanced course);

4) Course status (attendance type) – select one of the following options: CPC (compulsory course)/ EC (elective course)/ NCPC (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Faculty of Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Engineering sciences
1.5 Study level[2)]	Master degree
1.6 Study programme/ Qualification	Practical methods integrated in propulsion systems engineering

2. Data about the course

2.1 Name of course			General economics					
2.2 Course convenor			Conf.dr. Raluca Dania Todor					
2.3 Seminar/ laboratory/ project convenor			Conf.dr. Raluca Dania Todor					
2.4 Study year	1	2.5 Semester	1	2.6 Evaluation type	E	2.7 Course status	Content[3)]	SC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**2**	out of which: 3.2 lecture	**1**	3.3 seminar/ laboratory/ project	**1/0/0**
3.4 Total number of hours in the curriculum	**28**	out of which: 3.5 lecture	**14**	3.6 seminar/ laboratory/ project	**14/0/0**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	18
Additional documentation in libraries, specialized electronic platforms, and field research	11
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	14
Tutorial	2
Examinations	2
Other activities.....	18
3.7 Total number of hours of student activity	47
3.8 Total number per semester	**75**
3.9 Number of credits[5)]	3

4. Prerequisites (if applicable)

4.1 curriculum-related	
4.2 competences-related	

5. Conditions (if applicable)

5.1 for course development	
5.2 for seminar/ laboratory/project development	

6. Specific competences and learning outcomes

Professional competences	Cp1. The foundation of business strategies, the development of marketing plans within a business. L.O. 1.1 The graduate explains how to substantiate the decisions, effects and objectives pursued, for their adoption and implementation in an effective and responsible manner. L.O.1.2. The graduate chooses optimal decision options under the conditions of some probabilistic universes, but in a professional risk estimation environment. L.O. 1.3. The graduate argues the decisions made in the business environment and the techniques used in running the business. L.O. 1.4. The graduate proposes management systems for companies involved in business.

Transversal competences	Ct1 Application of professional ethics norms and values for decision-making and independent or group performance of complex tasks at work. L.O. 1.1 The graduate is able to design a real-time solution scheme for a problem at work and undertake its implementation, respecting the rules of professional ethics. Ct2. Assuming the need for continuous training to create the prerequisites for career progress and adaptation of one's own professional and managerial skills to the dynamics of the economic environment. L.O.2.1. The graduate is able to develop and present a personal continuous training plan to ensure the development of professional skills.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Understanding the basic concepts of the discipline
7.2 Specific objectives	• Working with the basic concepts of the discipline

8. Content

8.1 Course	Teaching methods	No.hours	Remarks
Introduction	Interactive presentations based on slides and group discussions	2	
Analysis of the business microenvironment	Interactive presentations based on slides and group discussions	2	
Analysis of the business macro environment	Interactive presentations based on slides and group discussions	2	
Particularities in the product strategy for industrial goods	Interactive presentations based on slides and group discussions	2	
Product strategies used in B2B markets	Interactive presentations based on slides and group discussions	2	
Distribution strategies used in B2B markets	Interactive presentations based on slides and group discussions	2	
Promotion strategies used in B2B markets	Interactive presentations based on slides and group discussions	2	
Bibliography 1. Parta Dasgupta (2020)- „Economie- o foarte scurta introducere", Edituta Litera. 2. N.Gregory Monkiw (2015)- „Principles of Economics", Ed. Cengage. 3. Constantin Daniel Avram(2012)- „Economie generala", Ed. Universitaria Craiova			
8.2 Seminar/ laboratory/ project	Teaching-learning methods	No.hours	Remarks
Introduction to basic economic concepts	Interactive presentation and group discussions.	2	
Product levels and added value	Case studies and group exercises to identify the levels of a product.	2	
Market research methods	Theoretical exposure and practical workshop where participants develop a simple market research plan	2	
Defining the target market	Applied exercises for identifying the target market according to a case study.	2	
Unique Selling Proposition (USP) formulation - Proposed value	Theoretical exposition and practical exercise of formulating a USP for a specific product.	2	

PEST analysis	Theoretical exposure with the activity of performing a PEST analysis applied to an industry example.	2	
Creation of promotional materials	Theoretical exposition with practical activity where participants design a simple promotional material (poster, brochure, social media post).	2	

Bibliography

1. Parta Dasgupta (2020)- „Economie- o foarte scurta introducere", Edituta Litera.
2. N.Gregory Monkiw (2015)- „Principles of Economics", Ed. Cengage.
3. Constantin Daniel Avram(2012)- „Economie generala", Ed. Universitaria Craiova

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

Preparing future specialists in the field of engineering sciences in order to understand the basic economic principles related to profitability

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	The practical application of the studied concepts	Oral exam	50%
10.5 Seminar/ laboratory/ project	Project	Presentation	50%
10.6 Minimal performance standard			
◘ Operation with specific concepts ◘ Critical evaluation of emerging situations ◘ Preparation of seminar projects			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024.

Prof.dr.ing. Ioan Călin, ROȘCA

Dean

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Conf.dr. Raluca Dania TODOR

Course holder

Conf.dr. Raluca Dania TODOR

Holder of seminar/ laboratory/ project

Note:

1) Field of study – select one of the following options: Bachelor / Mast

2) er / Doctorat (to be filled in according to the forceful classification list for study programmes);

3) Study level – choose from among: Bachelor / Master / Doctorat;

[4] Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

[5] Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

[6] One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Practical integrated methods for propulsion systems engineering

2. Data about the course

2.1 Name of course			Mechanics of Materials					
2.2 Course convenor			Prof.dr.eng. Teodorescu-Drăghicescu Horațiu					
2.3 Laboratory convenor			Prof.dr.eng. Teodorescu-Drăghicescu Horațiu					
2.4 Study year	I	2.5 Semester	I	2.6 Evaluation type	E	2.7 Course status	Content[3)]	SC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**3**	out of which: 3.2 lecture	**2**	3.3 laboratory	**1**
3.4 Total number of hours in the curriculum	**42**	out of which: 3.5 lecture	**28**	3.6 seminar/ laboratory/ project	**14**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	23
Additional documentation in libraries, specialized electronic platforms, and field research	28
Preparation of laboratories	24
Tutorial	6
Examinations	2
Other activities.....	

3.7 Total number of hours of student activity	83
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• Basic knowledge: mechanics, strength of materials, experimental methods in mechanical engineering, propulsion systems, technical drawing
4.2 competences-related	• Specific knowledges and skills in Mechanical Engineering, Aerospatial Engineering, Automotive Engineering, Mechatronics and Robotics, Electrical Engineering, Systems Engineering, Computer and Information Technology, Informatics

5. Conditions (if applicable)

5.1 for course development	• Course room with video-projector, white board
5.2 for seminar/ laboratory/ project development	• System of optical analysis of 3D deformations for materials and components using DIC method (Digital Image Correlation), GOM Corelate Pro software • LS100 Plus; LR5K Plus; Texture Analyser universal materials testing machines, Nexygen Plus software

6. Specific competences and learning outcomes

Professional competences	**Cp1. Ability to develop products and defining the selection criteria of design solutions for propulsion systems** **L.O.2.1** The graduate may concepts sketches and design elements necessary to elaborate and comunicate the design concepts **L.O. 2.2** The graduate may analyses the principles that have to be used in developing technical projects **L.O.2.3** The graduate may uses the technical documentation in technical process in general and, particularly, to accomplishment the propulsion systems **Cp2. Ability to apply the simulation and testing methods for propulsion systems and using the specialized design programmes (CAD/CAE)** **L.O.2.1** The graduate may simulates the behaviour of propulsion systems models on specialized software basis **L.O.2.2** The graduate may elaborates testing protocols and analysis the collected data during testing to formulate conclusions and solutions **L.O.2.3** The graduate may designs and accomplishes prototypes to evaluate the tests of propulsion equipments **L.O.2.4** The graduate may uses assisted engineering software specific to the design of propulsion systems (dedicate software for CAE) **L.O.2.5** The graduate may uses computer assisted design systems (dedicated software CAD)
Transversal competences	**Ct1. Defining and/or using concepts, theories and scientific methods in the field of Mechanical Engineering** **L.O.1.1** The graduate is able to use properly the speciality information in proffesional communication **L.O. 1.2** The graduate is able to apply the earned practical and theoretical knowledges, the methods and terminology in the field of Mechanical Engineering **L.O.2.3** The graduate has the ability to coordinate conception activities, calculus and design of a propulsion/mechanical system **Ct2. Autonomy and critical thinking** **L.O.2.1** The graduate is able to develop his own way to resolve a task, working motivated, with little or no guidance **L.O. 2.2** The graduate has autonomy in taking technical decisions or those regarding the management of design activities **L.O.2.3** The graduate is able to ensure the quality of a mechanical structure or of a product/mechanical system **L.O.2.4** The graduate is able to elaborate responsible and efficient working strategies, with the application of professional etiq code values, norms and principles **L.O.2.5** The graduate has the capacity of objective self evaluation of need of formation during the whole life, using information and communication in a foreign language with the purpose of insertion in the working market and continuous adapting to its requirements

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Development of technical and analytical competencies in the field of the mechanics of composite materials
7.2 Specific objectives	

8. Content

8.1 Course	Teaching methods	No. hours	Remarks
Introduction in the mechanics of composite materials	Classic, interactive, explanation, demonstration, problem formulation	2	
Mechanical particularities of lamina	Classic, interactive, explanation, demonstration, problem formulation	4	

Mechanical particularities of composite laminate	Classic, interactive, explanation, demonstration, problem formulation	4	
Standardization and testing methods of polymer matrix composites	Classic, interactive, explanation, demonstration, problem formulation	4	
Materials testing equipments and data analysis software	Classic, interactive, explanation, demonstration, problem formulation	2	
System for optical analysis of 3D deformations for materials and components using the DIC method (Digital Image Correlation)	Classic, interactive, explanation, demonstration, problem formulation	4	
Accomplishment of specimens from various composite structures	Classic, interactive, explanation, demonstration, problem formulation	4	
Determination of mechanical properties of various composite structures	Classic, interactive, explanation, demonstration, problem formulation	4	

References

1. Gheorghiu, H., Hadăr, A., Constantin, N., Analiza structurilor din materiale izotrope și anizotrope, Ed. Printech, București, 1998
2. Teodorescu, H., Fundamentele și mecanica materialelor compozite polimerice, Ed. Universității Transilvania din Brașov, ISBN 978-635-878-4, 2007
3. Scutaru, M.L., Teodorescu-Drăghicescu, H., Vlase, S., Mecanică tehnică, Infomarket, ISBN 978-973-1747-15-6, 2009
4. Teodorescu-Drăghicescu, H., Mecanică experimentală, Ed. Universității Transilvania din Brașov, ISBN 978-606-19-0528-7, 2015
5. www.gom.com

8.2 Laboratory	Teaching-learning methods	No. hours	Remarks
Presentation of materials testing equipments and data analysis software	Classic, interactive, explanation, demonstration, problem formulation System for optical analysis of 3D deformations for materials and components using the DIC method (Digital Image Correlation)	2	
Strength and rigidity evaluation of composite materials subjected to tensile, from experimental data sets. Training GOM Correlate	Classic, interactive, explanation, demonstration, problem formulation	4	
Strength and rigidity evaluation of composite materials subjected to bending, from experimental data sets. Training GOM Correlate	Classic, interactive, explanation, demonstration, problem formulation	4	
Strength and rigidity evaluation of composite materials subjected to compression, from experimental data sets. Training GOM Correlate	Classic, interactive, explanation, demonstration, problem formulation	4	

References

1. Gheorghiu, H., Hadăr, A., Constantin, N., Analiza structurilor din materiale izotrope și anizotrope, Ed. Printech, București, 1998
2. Teodorescu, H., Fundamentele și mecanica materialelor compozite polimerice, Ed. Universității Transilvania din Brașov, ISBN 978-635-878-4, 2007
3. Scutaru, M.L., Teodorescu-Drăghicescu, H., Vlase, S., Mecanică tehnică, Infomarket, ISBN 978-973-1747-15-

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4. Teodorescu-Drăghicescu, H., Mecanică experimentală, Ed. Universității Transilvania din Brașov, ISBN 978-606-19-0528-7, 2015
5. www.gom.com

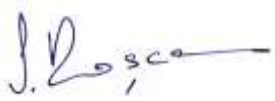
9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Properly description of an experimental method from the field of mechanics and its theoretical basics	Written	50%
10.5 Laboratory	Resolving of some practical problems	Test	50%
10.6 Minimal performance standard			
• Presentation of an experimental method from the field of mechanics and its theoretical basics • Properly work of a laboratory test			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024

Prof. univ. dr. eng. Ioan Călin ROȘCA



Dean

Prof. univ. dr. eng. Maria Luminița SCUTARU

Head of Department

Prof. univ. dr. eng. Horațiu TEODORESCU-DRĂGHICESCU

Course holder

Prof. univ. dr. eng. Horațiu TEODORESCU-DRĂGHICESCU

Holder of laboratory

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Reformulated fuels and biofuels					
2.2 Course convenor			Assoc. prof. dr. eng. Dumitrașcu Dorin-Ion					
2.3 Seminar/ laboratory/ project convenor			Assoc. prof. dr. eng. Dumitrașcu Dorin-Ion					
2.4 Study year	I	2.5 Semester	I	2.6 Evaluation type	E	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**3**	out of which: 3.2 lecture	**2**	3.3 seminar/ laboratory/ project	**0/1/0**
3.4 Total number of hours in the curriculum	42	out of which: 3.5 lecture	28	3.6 seminar/ laboratory/ project	0/14/0

Time allocation	hours
Study of textbooks, course support, bibliography and notes	34
Additional documentation in libraries, specialized electronic platforms, and field research	27
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	16
Tutorial	4
Examinations	2
Other activities.....	

3.7 Total number of hours of student activity	**83**
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	**5**

4. Prerequisites (if applicable)

4.1 curriculum-related	•
4.2 competences-related	•

5. Conditions (if applicable)

5.1 for course development	•
5.2 for seminar/ laboratory/ project development	•

6. Specific competences and learning outcomes

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems L.O.1.1. The graduate can design sketches and design elements necessary for the development and communication of design concepts; L.O.1.2. The graduate can analyze the principles to be used in the development of technical projects L.O.1.3. The graduate can use technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;

Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. L.O.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the conception, calculation and design activity of a propulsion system/mechanical system. CT2. Autonomy and critical thinking L.O.2.1 The graduate develops his own way of solving a task, working motivatedly, with little or no supervision. L.O.2.2 The graduate has autonomy in making technical decisions or those related to the management of design activities L.O.2.3 The graduate has the ability to ensure the quality of a mechanical structure and product/mechanical system. L.O.2.4 The graduate can develop efficient and responsible work strategies, applying the principles, norms and values of the code of professional ethics. L.O.2.6 The graduate has the ability to objectively self-assess the need for lifelong learning, use information and communication in an internationally spoken language for the purpose of insertion in the labor market and continuous adaptation to its requirements. CT3. Preparation and presentation of reports describing the results and processes of scientific or technical research. L.O.3.1 The graduate can write and present technical reports for semester practice and/or for discipline projects, going through all the necessary stages, from documentation, idea/concept, modeling/simulation to testing/validation. L.O.3.2 The graduate understands and ensures compliance with the norms of ethics and academic integrity in writing reports. L.O.3.3 The graduate works independently for the purpose of scientific information and to obtain the data necessary to solve the project topics; identifies his own sources of documentation. L.O.3.4 The graduate has the capacity for interpersonal communication, professional counseling and assuming leadership roles in the work team.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	◘ The course has as its main objective the knowledge of students of current trends regarding the evolution of automotive fuels, the correlation of their properties with the modifications made to internal combustion engines, especially with complex chemical pollution reduction systems.
7.2 Specific objectives	◘ Presentation of both the reformulation trends of classic fuels and the conditions and context of the use of alternative fuels;

8. Content

8.1 Course	Teaching methods	No. hours	Remarks
1. Chemical composition of crude oil, fuels	Video projector, debates	2	
2. Sources and technologies for obtaining fuels		2	
3. Fossil fuels: physicochemical and exploitation characteristics		4	
4. Alternative fuels		4	
5. Gaseous fuels		4	
6. Use of alternative fuels in internal combustion engines		4	
7. Environmental protection		2	
8. Reduction of fuel consumption		2	

9. Special fuels	Video projector, debates	2	
10. Alternative fuel and propulsion systems		2	
Bibliography 1. Arthur M. Brownstein, Renewable motor fuels, elsevier, 2015 2. Transitions to alternative vehicles and fuels, National Academy of Science, 2013 3. George E. Totten, Fuels and Lubricants Handbook, 2003 4. Harold H. Schobert, Chemistry of fossil fulels and biofuels, Cambridge University Press, 2013 5. James G. Speight, Synthetic fuels handbook, Mc Graw Hill, 2008 6. M.K. Gajendra Babu, Alternative transportation fuels, CRC Press, 2013			
8.2 Seminar/ laboratory/ project	Teaching-learning methods	No. hours	Remarks
1. Influence of hydrocarbon class composition on performance and pollutant emissions; evaluation of fuel octane number	Video projector, debates, practical activities	2	
2. Interpretation of the distillation curve of a fuel; correlations with engine handling and economy		2	
3. Analysis of the vacuum distillation curve of a biodiesel mixture; Influence of biodiesel content on t10. t50, t90		2	
4. Corrosive effects produced by the water content of the fuel; Determination of the degree of water contamination		2	
5. Determination of fuel density		2	
6. Safety in operation of fuels. Determination of the flash point		2	
7. Analysis of engine operation with two different fuels; influence on performance and emissions		2	
Bibliography 1. Arthur M. Brownstein, Renewable motor fuels, elsevier, 2015 2. Transitions to alternative vehicles and fuels, National Academy of Science, 2013 3. George E. Totten, Fuels and Lubricants Handbook, 2003 4. Harold H. Schobert, Chemistry of fossil fulels and biofuels, Cambridge University Press, 2013 5. James G. Speight, Synthetic fuels handbook, Mc Graw Hill, 2008 6. M.K. Gajendra Babu, Alternative transportation fuels, CRC Press, 2013 7. Maximino Manzanera, Alternative fuel, InTech, 2011 8. Michael Frank Hordeski, Alternative fuels—the future of hydrogen, CRC Press, 2007 9. Richard Folkson, Alternative Fuels and Advanced Vehicle Technologies for Improved Environmental Performance, Woodhead Publishing, 2014			

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

The content of the discipline, the skills acquired by students through participation in this course are consistent with the specific requirements necessary to address research topics in the field of fuels, the adaptation of unconventional fuels to conventional vehicles, and the assessment of the situation of car fleets from the point of view of fuel supply.

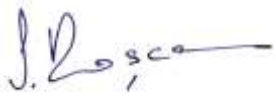
10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Knowledge of theoretical aspects	Exam	50%
	Practical analysis		
10.5 Seminar/ laboratory/	Evaluation test	Test	25%

project	Practical test		25%
10.6 Minimal performance standard			
• The grades obtained for the laboratory activities, respectively in the exam must be at least 5.			

This course outline was certified in the Department Board meeting on 27.09.2024 and approved in the Faculty Board meeting on 30.09.2024.

Prof. dr. ing. Ioan Călin ROȘCA,



Dean

Prof. dr. ing. Maria Luminița SCUTARU

Head of Department

Conf. dr. ing. Dorin Ion DUMITRAȘCU,

Course holder

Conf. dr. ing. Dorin Ion DUMITRAȘCU,

Holder of laboratory

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Practical integrated methods for propulsion systems engineering

2. Data about the course

2.1 Name of course			Academic ethics and integrity					
2.2 Course convenor			Senior lecturer Simona ŞOICA, PhD					
2.3 Seminar/ laboratory/ project convenor								
2.4 Study year	I	2.5 Semester	I	2.6 Evaluation type	C	2.7 Course status	Content[3)]	SC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**1**	out of which: 3.2 lecture	**1**	3.3 seminar/ laboratory/ project	**-**
3.4 Total number of hours in the curriculum	14	out of which: 3.5 lecture	14	3.6 seminar/ laboratory/ project	-

Time allocation	hours
Study of textbooks, course support, bibliography and notes	10
Additional documentation in libraries, specialized electronic platforms, and field research	12
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	12
Tutorial	
Examinations	2
Other activities.....	

3.7 Total number of hours of student activity	36
3.8 Total number per semester	**50**
3.9 Number of credits[5)]	2

4. Prerequisites (if applicable)

4.1 curriculum-related	
4.2 competences-related	• Communication and academic writing

5. Conditions (if applicable)

5.1 for course development	
5.2 for seminar/ laboratory/ project development	• Room equipped with projector/TV, board and marker.

6. Specific competences and learning outcomes

Professional competences	
Transversal competences	TC1. Define and/or use scientific concepts, theories and methods in mechanical engineering R.Î.1.1 The graduate is able to use specialized information in professional communication. R.Î.1.2 The graduate is able to apply theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. R.Î.1.3 The graduate is able to coordinate the conception, calculation and design of a propulsion/mechanical system. TC2. Autonomy and critical thinking R.Î.2.1 The graduate develops his/her own way of solving a task, working in a motivated manner and independently. R.Î.2.2 The graduate is able to make technical or management decisions related to designing tasks. R.Î.2.3 The graduate is able to assure the quality of a mechanical structure and mechanical product/system. R.Î.2.4 The graduate is able to develop strategies for effective and responsible work, applying the principles, rules and values of the code of professional ethics. R.Î.2.6 The graduate is able to assess his/her own need for lifelong learning, to use of information and communication in an international language in order to adapt to the continuous requirements of the labor market. TC3. Prepare and present reports describing the results and processes of scientific or technical research. R.Î.3.1 The graduate is able to write and present technical reports for academic and scientific projects, going through all the necessary steps from documentation, idea/conception, modeling/simulation, and testing/validation. R.Q.3.2 The graduate understands and comply with the standards of ethics and academic integrity in report writing. R.Î.3.3 The graduate works independently for the purpose of scientific information in order to obtain the data needed to solve project assignments; identifies own sources of documentation. R.Î.3.4 The graduate masters interpersonal communication skills, and assumes leadership roles in the teamwork.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Ethics in scientific research
7.2 Specific objectives	• Adapt and apply scientific writing rules in line with international standards. • Managing professional writing

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
8.1.1. Scientific discourse; Importance of ethics in scientific research.	Problematization. Applications	1	
8.1.2. Elaboration of academic and scientific work: Documentation, Research. Scientific databases	Problematization. Applications	2	
8.1.3. Elaboration of academic and scientific work: thesis, hypotheses, research methods	Problematization. Applications	2	
8.1.4. Elaboration of academic and scientific work:	Problematization.	2	

Research methods in engineering	Applications		
8.1.5. Elaboration of academic and scientific work: Organizing texts, writing the abstract;	Problematization. Applications	2	
8.1.6. Elaboration of academic and scientific work: Adapting internationally agreed styles;	Problematization. Applications	2	
8.1.7. Writing technical/scientific texts (technical reports, instructions, procedures, user manuals);	Problematization. Applications	3	

Bibliography

Alley, M. (2018) *The craft of scientific writing*. New York: Springer.

Bailey, S. (2003) *Academic Writing: A practical guide for students*. London: Routledge.

Barrass, R. (2002) *Scientists Must Write: A guide to better writing for scientists, engineers and students*. London: Routledge.

Laplante, P.A. (2012) *Technical writing*. Boca Raton: CRC Press Taylor & Francis Group.

Marder, M. P. (2011). *Research methods for science*. Cambridge: Cambridge University Press.

Thiel, D. V. (2014). *Research methods for engineers*. Cambridge: Cambridge University Press

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

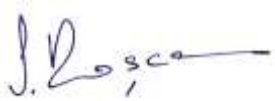
- Academic and scientific rigor and honesty;
- Adapt technical writing skills to the future workplace

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Applying seminar concepts	Written exam	100%
10.5 Seminar/ laboratory/ project			
10.6 Minimal performance standard			
• Complying with the rules of scientific writing and obtaining the passing grade			

This course outline was certified in the Department Board meeting on 2709/2024 and approved in the Faculty Board meeting on 30/09/2024

Prof.dr.ing. Ioan Călin, ROȘCA



Dean

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Senior lecturer Simona ȘOICA, PhD

Course holder

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Metode practice integrate în ingineria sistemelor de propulsie Practical integrated methods for propulsion systems engineering

2. Data about the course

2.1 Name of course			Predictive maintenance for industrial equipment					
2.2 Course convenor			Prof.PhD.eng. Ioan Călin ROȘCA					
2.3 Seminar/ laboratory/ project convenor			Prof.PhD.eng. Ioan Călin ROȘCA					
2.4 Study year	I	2.5 Semester	1	2.6 Evaluation type	E	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	EC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**4**	out of which: 3.2 lecture	**2**	3.3 Laboratory	**2**
3.4 Total number of hours in the curriculum	**56**	out of which: 3.5 lecture	**28**	3.6 Laboratory	**28**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	20
Additional documentation in libraries, specialized electronic platforms, and field research	15
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	20
Tutorial	11
Examinations	3
Other activities	

3.7 Total number of hours of student activity	69
3.8 Total number per semester	125
3.9 Number of credits[5)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• Not provided in the curriculum
4.2 competences-related	• Basic knowledge of mechanical engineering • Software operating abilitie

5. Conditions (if applicable)

5.1 for course development	• Lectures are held in rooms with internet access and multimedia teaching equipment
5.2 for seminar/ laboratory/ project development	• The laboratory will be done in university laboratory and at Schaeffler company using computers equiped with specific software.

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems R.Î.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; R.Î.1.2. The graduate can analyze the principles that must be used in the development of technical projects R.Î.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems; C2. The ability to apply simulation and testing methods for propulsion systems and to use specialized programs for design (CAD/CAE) R.Î.2.1. The graduate can simulate the behavior of propulsion system models based on specialized software; R.Î.2.2. The graduate can develop test protocols and interpret and analyze data collected during testing to formulate conclusions and solutions.
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering R.Î.1.1 The graduate can adequately use specialized information in professional communication. R.Î.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. CT2. Autonomy and critical thinking R.Î.2.1 The graduate develops his own way of solving a task, working motivated, with little or no supervision. R.Î.2.2 The graduate has autonomy in making technical decisions or those related to the management of design activities

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Provide students with the principles, tools and methods monitoring different industrial equipment for a predictive maintenance
7.2 Specific objectives	• Develop team work skills so that learners can work with other people to assist in the improvement of the quality equipment

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
Course 1. Predictive maintenance basics. 1.1.Maintenance philosophies; 1.2. Evolution of maintenance philosophies; 1.3. Plant machinery classification; 1.4. Principle of predictive maintenance; 1.5. Predictive maintenance techniques	Heuristic conversation, examples	2h	
Course 2. Data acquisition. 2.1. Introduction; 2.2. Vibration transducers (characteristics and mounting); 2.3. Conversion of vibrations in electrical signal; 2.4. Equipment used in data acquisition;		4h	
Course 3. Signal processing. 3.1. The Fast Fourier Transform (FFT) analysis; 3.2. Time analysis; 3.3. Phase analysis; 3.4. Special signal processes.		2h	
Course 4. Vibration sources, path, response. 4.1. Vibration sources; 4.2. Vibrations propagation; 4.3. Frequency response function;		2h	
Course 5. Machine fault diagnosis based on vibration analysis 5.1. Introduction; 5.2. Machinery fault diagnosed by vibration analysis; 5.3. Machinery fault diagnosed by noise analysis;		4 h	
Course 6. Different predictive maintenance technique. 6.1. Introduction; 6.2. Ultrasound; 6.3. Infrared thermography		2h	

Course 7. Correcting faults that cause vibrations – 7.1. Introduction; 7.2. Balancing; 7.3. Alignment; 7.4. Resonance vibration control with dynamic absorbers.	Heuristic conversation, examples	4 h	
Course 8. Correcting faults that cause vibrations – 2 (machine elements). 8.1. Bearing diagnosis; 8.2. Gears diagnosis; 8.3. Sleeve bearing diagnosis; 8.4. Chain transmission diagnosis; 8.5. Belt transmission diagnosis; 8.6. Cams transmission diagnosis.		4 h	
Course 9. Correcting faults that cause vibrations – 3 (machine tools) 9.1. Electric motors diagnosis; 9.2. Fans diagnosis; 9.3. Turbochargers diagnosis; 9.4. Machine tools diagnosis; 9.5. Hydraulic systems diagnosis.		4 h	

Bibliography

1. Gafițeanu, M., Crețu, Sp., Drăgan, B. – Diagnosticarea vibroacustică a mașinilor și utilajelor, Editura tehnică, ISBN 973-31-0123-0, 1989.
2. Moubray, J.: Reliability centered Maintenance II, Industrial Press, New York, 2000.
3. Paresh Girdhar – Practical Machinery Vibration Analysis and Predictive Maintenance, Elsevier, ISBN 0-7506-6275-1, 2004
4. Roșca I. C. – Mechanical Vibrations, Editura Universității Transilvania din Brașov, 2009
5. * * * - RCM GUIDE RELIABILITY-CENTERED MAINTENANCE GUIDE, NASA, September 2008 (https://fred.hq.nasa.gov/Assets/Docs/2015/NASA_RCMGuide.pdf)

8.2 Laboratory	Teaching-learning methods	Number of hours	Remarks
Equipment used in predictive maintenance	Heuristic conversation, Tests	2 h	
The Fast Fourier Transform (FFT) and time analysis;		4 h	
Frequency response function		2 h	
Noise analysis		4 h	
Bearing diagnosis		4 h	
Gears diagnosis		4 h	
Electric motors diagnosis		4 h	
Machine tools diagnosis		4 h	

Bibliography

1. Paresh Girdhar – Practical Machinery Vibration Analysis and Predictive Maintenance, Elsevier, ISBN 0-7506-6275-1, 2004

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers)

The graduate students will be able to detect, by measuring, the possible defects of different industrial equipment and will be able to offer suggestions on predictive maintenance.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Evaluation consists of a scale questionnaire	Multiple choice questionnaire	80%
10.5 Laboratory	Develop criteria to use for gaining feedback	Testing the ability to do a test	20%
10.6 Minimal performance standard			
• To be able to present the basics of the maintenance technique			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024.

Prof.dr.ing. Ioan Călin ROȘCA,

Dean

Prof.dr.ing. Maria Luminița SCUTARU,

Head of Department

Prof.dr.ing. Ioan Călin ROȘCA,

Course holder

Prof.dr.ing. Ioan Călin ROȘCA,

Holder of seminar

Note:

1) Field of study – select one of the following options: BA/MA/PhD. (to be filled in according to the forceful classification list for study programmes);
2) Study level – *choose from among:* BA/MA/PhD.;
3) Course status (content) – *for the BA level, select one of the following options:* **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); *for the MA level, select one of the following options*: **PC** (proficiency course)/ **SC** (synthesis course)/ **AC** (advanced course)
4) Course status (attendance type) – *select one of the following options:* **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);
5) One credit is the equivalent of 25 – 30 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Metode practice integrate în ingineria sistemelor de propulsie Practical integrated methods for propulsion systems engineering

2. Data about the course

2.1 Name of course			Noise and vibrations in manufacturing					
2.2 Course convenor			Prof.dr.eng. Ioan Călin ROȘCA					
2.3 Laboratory			Prof.dr.eng. Ioan Călin ROȘCA					
2.4 Study year	I	2.5 Semester	1	2.6 Evaluation type	E	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	EC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**4**	out of which: 3.2 lecture	**2**	3.3 Laboratory	**2**
3.4 Total number of hours in the curriculum	**56**	out of which: 3.5 lecture	**28**	3.6 Laboratory	**28**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	20
Additional documentation in libraries, specialized electronic platforms, and field research	15
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	20
Tutorial	11
Examinations	3
Other activities	

3.7 Total number of individual study hours	69
3.8 Total number per semester	125
3.9 Number of credits[5)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• Not provided in the curriculum
4.2 competences-related	• Basic knowledge of mechanical engineering • Software operating abilitie

5. Conditions (if applicable)

5.1 for course development	• Lectures are held in rooms with internet access and multimedia teaching equipment
5.2 for seminar/ laboratory/ project development	• The laboratory will be done in university laboratory and at Schaeffler Romania company using computers equiped with specific software.

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems R.Î.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; R.Î.1.2. The graduate can analyze the principles that must be used in the development of technical projects R.Î.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems; C2. The ability to apply simulation and testing methods for propulsion systems and to use specialized programs for design (CAD/CAE) R.Î.2.1. The graduate can simulate the behavior of propulsion system models based on specialized software; R.Î.2.2. The graduate can develop test protocols and interpret and analyze data collected during testing to formulate conclusions and solutions.
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering R.Î.1.1 The graduate can adequately use specialized information in professional communication. R.Î.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. CT2. Autonomy and critical thinking R.Î.2.1 The graduate develops his own way of solving a task, working motivated, with little or no supervision. R.Î.2.2 The graduate has autonomy in making technical decisions or those related to the management of design activities

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Provide students with the principles, tools and methods used in mechanical vibrations, stability and noise describtion related to the manufacturing process and involved equipment;
7.2 Specific objectives	• Develop the ability to do models of mechanical equipment used in mechanical vibrations, stability and noise analysis; • To identify parameters of cutting process and noise control; • To offer solution for increasing the stability and noise reduction.

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
Course 1. Basic of vibrations 1.1.Definition; 1.2. Systems with one degree of freedom; 1.3. Systems with two degrees of freedom; 1.4. Systems with multiple degrees of freedom;	Heuristic conversation, examples	2h	
Course 2. The cutting process. 2.1. The cutting process considered as a dynamic process; 2.2. Inner and outer modulation in the dynamics of the cutting process; 2.3. The cutting process considered as a linear dynamic system; 2.4. The cutting process considered as a non-linear dynamic system; 2.5. The cutting process considered as a random dynamic system;		2h	
Course 3. Identification of the cutting process system parameters 3.1. The linear dynamic cutting system; 3.2. The harmonically linearized dynamic machining system;		2h	
Course 4. Particular cases of cutting process systems. 4.1. System of drilling; 4.2. System of milling; 4.4. System of grinding;		4h	

Course 5. Variation of the parameters of the cutting process depending on the machining conditions. 5.1. Influence of the conditions under which the identification of the cutting process system parameters is carried on; 5.2. Identification of production and setting of metal-cutting process.	Heuristic conversation, examples	4h	
Course 6. The elastic structure of the machine tools. 6.1. Particularities of the machine-tools structures; 6.2. Models of the elastic structures; 6.3. Identification of the dynamic characteristic of the elastic structures; 6.4. Simultaneous identification of the parameters of cutting process and elastic system		4h	
Course 7. Stability of the time invariant dynamic machining systems 7.1. Equations of the dynamic machining systems; 7.2. Stability of the single variable dynamic machining system; 7.3. Stability of the multivariable variable dynamic machining system; 7.4. Graphical methods for stability analysis		4h	
Course 8. Noise. 8.1. Introduction; 8.2. Basic of acoustics; 8.3. Levels of noise; 8.4. Noise sources in manufacturing process; 8.5. Noise maps in industry; 8.6 Standards of noise in industry; 8.8. Noise measurement technique.		4h	
Course 9. Noise protection systems 9.1. Introduction; 9.2. Technical solutions for noise reducing; 9.3. Design of noise system protection. Silencer design;		2h	

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1. Chiriacescu T. Sergiu – Stability in the dynamics of metal cutting, Elsevier, Studiess in Applied Mechanics, ISBN 973-27-0055-6
2. Cheremisinoff P. Nicholas – Noise control, A practical guide, ISBN: 978-0-8155-1399-5, 1996
3. Gafițeanu, M., Crețu, Sp., Drăgan, B. – Diagnosticarea vibroacustică a mașinilor și utilajelor, Editura tehnică, ISBN 973-31-0123-0, 1989.
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5. Randall F. Barron - Industrial Noise Control and Acoustics, ISBN: 0-8247-0701-X, 2003
6. Roșca I. C. – Acustică tehnică, Editura Universității Transilvania din Brașov, 2015
7. * * * - Environmental noise measurement, Bruel & Kjaer, https://www.bksv.com/media/doc/br0139.pdf
8. * * * - Brüel & Kjær Sound & Vibration Measurement, http://www.cav.psu.edu/workshops/2014/B&K%20Intro.pdf
9. * * * - Matlab user manuals

8.2 Laboratory	Teaching-learning methods	Number of hours	Remarks
Laboratory 1 – Dynamic behaviour of S.D.F systems. Systems response by transfer function	Heuristic conversation, Examples in MATLAB	4 hours	
Laboratory 2 – Dynamic behaviour of M.D.F systems. Systems response.	Heuristic conversation. Examples in MATLAB	6 hours	
Laboratory 3 – Stability of systems	Heuristic conversation Examples in MATLAB	4 hours	
Laboratory 4 – Noise measurement equipment. Tests of noise level of sound souces	Heuristic conversation, Tests in situ	6 hours	
Laboratory 5 – Measurements of noise levels of different manufacturing places	Heuristic conversation, Tests	8 hours	

Bibliography
1. Cheremisinoff P. Nicholas – Noise control, A practical guide, ISBN: 978-0-8155-1399-5, 1996
2. * * * - Brüel & Kjær Sound & Vibration Measurement, http://www.cav.psu.edu/workshops/2014/B&K%20Intro.pdf
3. * * * - Matlab user manuals

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers)

The graduate students will be able to detect identify the system parameters of machine tools and cutting tool and noise generated by the manufacturing process in perspective to diminish the negative effect of vibrations and noise.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Evaluation consists of a scale questionnaire	Multiple choice questionnaire	80%
10.5 Laboratory	Develop criteria to use for gaining feedback	Testing the ability to do a test	20%
10.6 Minimal performance standard			
• To be able to present the basics of the vibrations and noise			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/10/2024.

Prof.dr.ing. Ioan Călin ROȘCA,

Dean

Prof.dr.ing. Maria Luminița SCUTARU,

Head of Department

Prof.dr.ing. Ioan Călin ROȘCA,

Course holder

Prof.dr.ing. Ioan Călin ROȘCA,

Holder of seminar

Note:

1) Field of study – select one of the following options: BA/MA/PhD. (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: BA/MA/PhD;

3) Course status (content) – for the BA level, select one of the following options: FC (fundamental course) / DC (course in the study domain)/ SC (speciality course)/ CC (complementary course); for the MA level, select one of the following options: PC (proficiency course)/ SC (synthesis course)/ AC (advanced course);

4) Course status (attendance type) – select one of the following options: CPC (compulsory course)/ EC (elective course)/ NCPC (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Professional intership					
2.2 Course convenor								
2.3 ~~Seminar/ laboratory/~~ project convenor								
2.4 Study year	I	2.5 Semester	1	2.6 Evaluation type	C	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**12**	out of which: 3.2 lecture	**0**	3.3 Project	**12**
3.4 Total number of hours in the curriculum	**168**	out of which: 3.5 lecture	**0**	3.6. Project	**168**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	-
Additional documentation in libraries, specialized electronic platforms, and field research	50
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	70
Tutorial	28
Examinations	2
Other activities.....	20

3.7 Total number of individual learning hours	-
3.8 Total number per semester	-
3.9 Number of credits[4)]	**5**

4. Prerequisites (if applicable)

4.1 curriculum-related	
4.2 competences-related	• To be able to do projects

5. Conditions (if applicable)

5.1 for course development	
5.2 for seminar/ laboratory/ project development	• In the University laboratories and in the frame of Schaeffler Romania Company.

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems L.O.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; L.O.1.2. The graduate can analyze the principles that must be used in the development of technical projects L.O.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. L.O.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the activity of conception, calculation and design of a propulsion system/mechanical system.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• To do a project / semester that demonstrate engineering skills acquired during the first year semester
7.2 Specific objectives	• Improving knowledge acquired in the two semesters of the first year

8. Content

8.1 Project	Teaching methods	Remarks
Identify issues for project practice	Individual or team work	
Establishing project design practice		
Identification of development directions of the theme		
Analysis of the actual situation		
Determination of the solutions encountered problems		
Presentation of projects		

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers)

The topic is made with the company Schaeffler Romania is centered on a theme of its own

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course			
10.5 Project	Scientofic level of the project	Oral presentation	100%
10.6 Minimal performance standard			
• Students must prove, by design, the properties of terms and technical foundations.			

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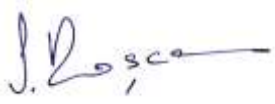
This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024

Prof.dr.ing. Ioan Călin, ROȘCA



Dean

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Course holder **Not the case**	**Holder of project** **Individual holder**

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: FC (fundamental course) / DC (course in the study domain)/ SC (speciality course)/ CC (complementary course); for the Master level, select one of the following options: PC (proficiency course)/ SC (synthesis course)/ AC (advanced course);

4) Course status (attendance type) – select one of the following options: CPC (compulsory course)/ EC (elective course)/ NCPC (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Shopfloor management					
2.2 Course convenor			Prof.dr.eng. Aurica Luminița Pârv					
2.3 Seminar/ laboratory/ project convenor			Prof.dr.eng. Aurica Luminița Pârv					
2.4 Study year	1	2.5 Semester	2	2.6 Evaluation type	E	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**3**	out of which: 3.2 lecture	**2**	3.3 seminar/ laboratory/ project	**0/0/1**
3.4 Total number of hours in the curriculum	42	out of which: 3.5 lecture	28	3.6 seminar/ laboratory/ project	0/0/14

Time allocation	hours
Study of textbooks, course support, bibliography and notes	16
Additional documentation in libraries, specialized electronic platforms, and field research	25
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	28
Tutorial	10
Examinations	1
Other activities.....	3

3.7 Total number of hours of student activity	**83**
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	**5**

4. Prerequisites (if applicable)

4.1 curriculum-related	• -
4.2 competences-related	• general knowledge of industrial management

5. Conditions (if applicable)

5.1 for course development	• Classroom with a whiteboard and projector
5.2 for seminar/ laboratory/ project development	• Laboratory with a whiteboard and projector

6. Specific competences and learning outcomes

Professional competences	**C3. Coordination of Quality Management System and Project Management** L.O.3.1. The graduate can plan, coordinate, and direct all production activities to ensure product quality. L.O.3.2. The graduate can carry out activities related to quality control by performing inspections and tests of services, processes, or products. L.O.3.3. The graduate can manage and plan various resources needed for a specific project and monitor the progress made within the project to achieve a specific objective within a given time frame and a predetermined budget. L.O.3.4. The graduate can perform cost and financial benefit analyses for a project over a certain period.
Transversal competence	

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Acquiring by students of methods for analyzing aspects related to the design and implementation of organizational structures;
7.2 Specific objectives	• Understanding how organizational structure, culture, and behavior (of the organization and their employees) influence (or are influenced by) their internal and external environment; • Familiarization with certain new concepts specific to organizations in the current context (design, culture, ethics, etc.)

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
Lean – concept, principles and methodology	Interactive lecture	2	
Gemba, gembutsu	Interactive lecture	2	
Value, Value Stream, Flow, Pull, Perfection	Interactive lecture	2	
Lean measurement: Cycle time, Takt time, Lead time	Interactive lecture	2	
Value stream mapping- Current state mapping	Interactive lecture	2	
Value stream mapping- Future state mapping	Interactive lecture	2	
4 P model - Philosophy, Process, People and partners, Problem solving	Interactive lecture	2	
Hexagon of Shop Floor Management	Interactive lecture	2	
Problem solving. Change point management	Interactive lecture	2	
Visual management. 5 M	Interactive lecture	2	
Standards. 5 S	Interactive lecture	2	
Communication. Efficiency improvement	Interactive lecture	2	

Bibliography

1. Stasiak Betlejewska, R., Potkany, M., Pârv, L. (2016). Contemporary trends in the innovative production and services management. Scientific monograph. Zagreb: Croatian Quality Managers Society, Radoslava Cimermana 36a, 10000. Croația. ISBN 978-953-8067-05-1
2. Tomski, P., Pârv, L. (2016). Resources – Organization – Efficiency. Monography. Częstochowa: Oficyna Wydawnicza Stowarzyszenia Menedżerów Jakości i Produkcji (SMJiP). Polonia. ISBN 978-83-63978-39-6
3. Pârv, A.L. (2015). Managementul datelor în ingineria inovativă. Braşov : Editura Universită ii Transilvania din Braşov. ISBN 978-606-19-0568-3
4. Pârv, A.L. (2015). Managementul produc iei. Teorie şi aplica ii ERP. Braşov : Editura Universită ii Transilvania din Braşov. ISBN 978-606-19-0553-9

8.2 Project	Teaching-learning methods	Number of hours	Remarks
Conduct a value stream mapping – both current and future. Prioritize and implement a range improvement tools	Project, team working	14 h	

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1. Stasiak Betlejewska, R., Potkany, M., Pârv, L. (2016). Contemporary trends in the innovative production and services management. Scientific monograph. Zagreb: Croatian Quality Managers Society, Radoslava Cimermana 36a, 10000. Croația. ISBN 978-953-8067-05-1
2. Tomski, P., Pârv, L. (2016). Resources – Organization – Efficiency. Monography. Częstochowa: Oficyna Wydawnicza Stowarzyszenia Menedżerów Jakości i Produkcji (SMJiP). Polonia. ISBN 978-83-63978-39-6
3. Pârv, A.L. (2015). Managementul datelor în ingineria inovativă. Braşov : Editura Universită ii Transilvania din Braşov. ISBN 978-606-19-0568-3
4. Pârv, A.L. (2015). Managementul produc iei. Teorie şi aplica ii ERP. Braşov : Editura Universită ii Transilvania din Braşov. ISBN 978-606-19-0553-9

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

The contents have been developed in accordance to the employers' requirements, so that the learning outcomes can be applied in the industrial environment and in research.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Understanding the significance of concepts in the field of organizational management	Continuous assessment with objective items Written exam with objective items	30% 30%
	Correct application of basic concepts in the field of organizational management	Recorded throughout the semester	10%
10.5 Project	Activities carried out during the semester	Oral presentation	30%
10.6 Minimal performance standard			
• Establishing the complexity and opportunity for developing and/or enhancing quality management as well as the effective development of a design project theme in the field, which involves using methods, processes, and tools aimed at planning, controlling, and improving quality.			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024.

Prof.dr.ing. Ioan Călin, ROȘCA

Dean

Prof.dr.ing. Aurica Luminița PÂRV

Course holder

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Prof.dr.ing.Aurica Luminița PÂRV

Holder of project

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

[2)] Study level – choose from among: Bachelor / Master / Doctorat;

[3)] Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

[4)] Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

[5)] One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study Master[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Practical Integrated Methods for Engines Engineering

2. Data about the course

2.1 Name of course			ERP Systems (SAP)					
2.2 Course convenor			Assoc.prof. Lucia-Antoneta CHICOŞ, PhD					
2.3 Seminar/ laboratory/ project convenor			Assoc.prof. Lucia-Antoneta CHICOŞ, PhD					
2.4 Study year	I	2.5 Semester	II	2.6 Evaluation type	E	2.7 Course status	Content[3)]	SC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**3**	out of which: 3.2 lecture	**2**	3.3 seminar/ laboratory/ project	**0/1/0**
3.4 Total number of hours in the curriculum	**42**	out of which: 3.5 lecture	**28**	3.6 seminar/ laboratory/ project	**14**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	34
Additional documentation in libraries, specialized electronic platforms, and field research	29
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	16
Tutorial	2
Examinations	2
Other activities	

3.7 Total number of hours of student activity	**83**
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	**5**

4. Prerequisites (if applicable)

4.1 curriculum-related	• They are not specified in the curricula
4.2 competences-related	• Competences in using computers

5. Conditions (if applicable)

5.1 for course development	• Room with projector, internet, computers and related software (SAP IDES ERP software system)
5.2 for seminar/ laboratory/ project development	• Laboratory room with projector, internet, computers and related software (SAP IDES ERP software system)

6. Specific competences

Professional competences	C3. Coordination of the quality management system and project management R.Î.3.1. The graduate can plan, coordinate and direct all production activities in order to ensure product quality R.Î.3.3. The graduate can manage and plan various resources needed for a specific project and monitor the progress recorded within the project to achieve a specific objective within a certain period of time and with a predetermined budget
Transversal competences	CT1. Defining and/or using scientific concepts, theories and methods in the field of mechanical engineering R.Î.1.1 The graduate can adequately use specialized information in professional communication CT2. Autonomy and critical thinking R.Î.2.1 The graduate develops his own way of solving a task, working motivatedly, with little or no supervision R.Î.2.4 The graduate can develop efficient and responsible work strategies, applying the principles, norms and values of the code of professional ethics R.Î.2.6 The graduate has the ability to objectively self-assess the need for lifelong learning, use information and communicate in an internationally spoken language for the purpose of insertion into the labor market and continuous adaptation to its requirements.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Acquiring competences in the use of ERP (Enterprise Resource Planning) systems and in particular of the SAP system (Systems, Applications and Products in Data Processing) as well as understanding the ways of integrating these competences in the economic activities carried out at the level of an organization
7.2 Specific objectives	• Use of ERP software products to plan, control and improve process quality • Understanding the purpose, technical, operational, organizational and strategic implications of ERP systems and motivation of organizations to implement ERP systems • Understanding basic concepts (organizational elements, master data, transactions) and learning key techniques for working in SAP R/3: Navigating in the system, managing the sessions and menus, using the Help, working with transactions etc. • Acquiring basic knowledge regarding integrated product data management in SAP ERP

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
Introduction: ERP,SAP	Interactive lecture, Exposure, PowerPoint presentation on video projector, Explanation by working directly in SAP IDES ERP	1	
ERP Software systems. ERP systems architecture		1	
SAP ERP modules		1	
Logging On, Interface, Menus		2	
SAP navigation, Sessions multiple, Matchcode		4	
Basic concepts in SAP: Organization elements, Master Data, Transactions		4	
Sales and Distibution (SD)		2	
Production Planning		4	
Material Requirements Planning		4	

Purchasing	Interactive lecture, Exposure, PowerPoint presentation on video projector, Explanation by working directly in SAP IDES ERP	3	
Outbound delivery, Picking, Transfer Order		2	

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1. Chicoş, L.A., Szabo, V.G., Aplicații în SAP® IDES ERP, Editura MatrixRom, ISBN 978-606-25-0576-9, 2020, Bucureşti
2. Chicoş, L.A., Sisteme Informatice Integrate I, Suport de curs, (in format electronic)
3. Dickersbach, J. Th., Keller, G., Production Planning and Control with SAP ERP, ISBN: 978-1-59229-360-5, SAP Press, 2010
4. Meniul Help al sistemului SAP IDES ERP
5. https://help.sap.com/doc/saphelp_46c/4.6C/en-US/e1/8e51341a06084de10000009b38f83b/frameset.htm
6. Getting Started, Release 4.6C, SAP AG, 2000 (https://help.sap.com/doc/saphelp_470/4.7/en-US/e1/8e51341a06084de10000009b38f83b/frameset.htm)
7. Material Master (LO-MD-MM), Release 4.6C, SAP AG, 2001 (https://www.consolut.com/en/s/sap-ides-access/ides-online-help-pdfs/; https://help.sap.com/doc/saphelp_46c/4.6C/en-US/e1/8e51341a06084de10000009b38f83b/frameset.htm)
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10. 10. Purchasing (MM-PUR), Release 4.6C, SAP AG, 2001 (https://www.consolut.com/en/s/sap-ides-access/ides-online-help-pdfs/; https://help.sap.com/doc/saphelp_46c/4.6C/en-US/e1/8e51341a06084de10000009b38f83b/frameset.htm)

8.2 Seminar/ laboratory/ project	Teaching-learning methods	Number of hours	Remarks
SAP Logging On, Interface, SAP standard menu, Favorites, Navigation in SAP; Help: Field, Matchcode	Interactive, Discussions PowerPoint presentation on video projector, Practical applications in SAP IDES ERP	1	
Basic concepts in SAP: organizational elements, Master Data, Transaction Codes, Material Master Data		1	
Sales Order Creation		1	
Material Requirements Planning on different levels		3	
Creating planned orders and production orders		3	
Purchasing: creating purchasing requisitions and purchasing orders		2	
Goods Movement: Goods receipt Goods Issue; production confirmation		2	
Outbound Delivery, Transfer Order, Picking		1	

Bibliography

1. Chicoş, L.A., Szabo, V.G., Aplicații în SAP® IDES ERP, Editura MatrixRom, ISBN 978-606-25-0576-9, 2020, Bucureşti

2. Chicoş, L.A., Sisteme Informatice Integrate I, Suport de curs, (in format electronic)
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5. https://help.sap.com/doc/saphelp_46c/4.6C/en-US/e1/8e51341a06084de10000009b38f83b/frameset.htm
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9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

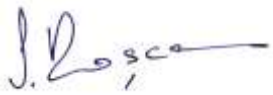
To establish the contents of the courses and laboratories, meetings were organized with representatives from the local economic environment (Schaeffler Romania company) and from Germany (Schaeffler Germany). The meetings aimed to identify the needs and expectations of the employers who manage the entire organization (and integrate it with various partners / organizations) through ERP systems.
The content of the discipline is in accordance with the requirements of the companies and the acquired skills will be required for graduates who work in profile organizations, and not only, who use ERP (Enterprise Resource Planning) systems for the integrated management of the entire organization.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Understanding the strategic implications of ERP systems	Written theoretical and practical assessment	50%
	Learning basic concepts in SAP ERP		
	Knowing of the essential techniques of working in SAP ERP		
	The ability to use and explain data related to SAP ERP modules (SD, MM, PP, Purchasing)		
10.5 Seminar/ laboratory/ project	Practical application of the knowledge acquired	Applications in SAP IDES ERP	50%
10.6 Minimal performance standard			
• Arguing the opportunity of implementing ERP systems for integrated management of organizations • Knowing of the basics of the SAP ERP software system: basic concepts, navigation in the system, display of the basic data of the material and explanation of the significance of the most important fields in Production Planning • Creating sales order, material planning by MRP running			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024.

Prof.dr. Ioan Călin ROȘCA,

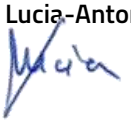


Decan

Prof.dr. Maria Luminița SCUTARU,

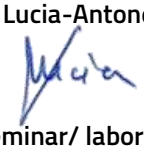
Director de departament

Assoc.prof. Lucia-Antoneta CHICOŞ, PhD,



Course holder

Assoc.prof. Lucia-Antoneta CHICOŞ, PhD,



Holder of seminar/ laboratory/ project

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);
2) Study level – choose from among: Bachelor / Master / Doctorat;
3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);
4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);
5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Advanced design for engines systems					
2.2 Course convenor			Professor PhD eng. Nicolae ISPAS					
2.3 Seminar/ laboratory/ project convenor			Lecteur PhD eng. Sebastian RADU					
2.4 Study year	I	2.5 Semester	II	2.6 Evaluation type	E	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**4**	out of which: 3.2 lecture	**2**	3.3 Project	**2**
3.4 Total number of hours in the curriculum	56	out of which: 3.5 lecture	28	3.6 Project	28
Time allocation					hours
Study of textbooks, course support, bibliography and notes					28
Additional documentation in libraries, specialized electronic platforms, and field research					11
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays					18
Tutorial					10
Examinations					2
Other activities.....					

3.7 Total number of hours of student activity	69
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• Not provided in the curriculum
4.2 competences-related	• Production management previous knowledge • Designing specifically software advanced knowledge

5. Conditions (if applicable)

5.1 for course development	• Lectures are held in rooms with internet access and multimedia teaching equipment
5.2 for seminar/ laboratory/ project development	• The project is carried out in rooms with internet access and computers equiped with specific software.

6. Specific competences and learning outcomes

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems R.Î.1.1. The graduate is able to devise sketches and design elements required to develop and communicate design concepts; R.Î.1.2. The graduate can analyze the principles to be used in the development of technical designs C2. The ability to apply simulation and testing methods for propulsion systems and to use specialized design software (CAD/CAE) R.Î.2.1. The graduate is able to simulate the behavior of propulsion system models based on specialized software; R.Î.2.2. The graduate is able to develop test protocols and interpret and analyze data collected during testing in order to formulate conclusions and solutions. R.Î.2.3. The graduate develops can design and realize prototypes for the evaluation of propulsion equipment tests; R.Î.3.4. The graduate is able to perform cost and financial benefit analysis for a project over a given period of time.
Transversal competences	CT1. Define and/or use scientific concepts, theories and methods in mechanical engineering R.Î.1.1 The graduate is able to make appropriate use of specialized information in professional communication. R.Î.1.2 The graduate is able to apply acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. R.Î.1.3 The graduate has the ability to coordinate the conception, calculation and design of a propulsion/mechanical system. CT2. Autonomy and critical thinking R.Î.2.1 The graduate develops their own way of solving a task, working in a motivated manner with little or no supervision. R.Î.2.2 The graduate has autonomy in making technical or management decisions related to design activities R.Î.2.3 The graduate has the ability to assure the quality of a mechanical structure and mechanical product/system. R.Î.2.4 The graduate is able to develop strategies for effective and responsible work, applying the principles, rules and values of the code of professional ethics. R.Î.2.6 The graduate has the ability to objectively self-assess the need for lifelong learning, the use of information and communication in an international language in order to enter the labor market and to adapt continuously to its requirements.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• To have advanced knowledge about design of the engines systems • To have advanced knowledge about exhaust gas treatment; • To have advanced knowledge about design of different parts of ICE; To have advanced knowledge about design of different new systems of engines.
7.2 Specific objectives	• To be able to use different designing software To be able to work in an advanced complex research team

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
1. Advanced design of modern gas exchange system, variable distribution system, electrohydraulic distribution system design, variable compression engine design requirement.	Video projector Black board Short problems solving	6 h	

2. Advanced design of the SI engines fuelling system	Video projector Black board Short problems solving	4 h	
3. Advanced design of the GDI engines fuelling system		4 h	
4. Advanced design of the CI engines fuelling system		3 h	
5. Advanced design of the engines lubricating system		2 h	
6. Advanced design of the engine supercharging system		4 h	
7. Advanced design of the engines cooling system		2 h	
8. Modern design of the engine exhaust gas system after treatment		3 h	

Bibliography

1. Heywood,J.,B. Internal Combustion Engine Fundamentals McGrew-Hill Book Company.1988 ISBN0- 070100499-8;
2. Benson, R., S., Whitehouse, N.,D. Internal combustion Engines Pergamon Press. 1979.ISBN 0-08-02271
3. Frank , W. (2012). Comparison of advanced waste heat recovery systems with a novel oil heating system. Australia.
4. Freymann, R., Ringler, J., Seifert, M., & Horst, T. (n.d.). The second generation turbosteamer. Munich.
5. Glavatskaya, Y., Gerard, O., Osoko, S. F., & Pierre, P. (n.d.). Heat recovery systems for passengers vehicles. Paris.
6. Jadhao, J., & Thombare, D. (2013). Review on exhaust gas heat recovery for I.C. engine.
7. Tianyou, W., YajunCofaru The turbosteamer: a system introducing the principle of cogeneration in automotive applications. (n.d.).
8. Ispas N..a. – Proiectarea motoarelor pentru autovehicule. Universitatea Transilvania Braşov, 1997

8.2 Project	Teaching-learning methods	Number of hours	Remarks
1.Advanced design of modern gas exchange system, variable distribution system, electrohydraulic distribution system design, variable compression engine design requirement.	Project Solving Evaluation	26 h	
2. Advanced design of the SI engines fuelling system			
3. Advanced design of the GDI engines fuelling system			
4. Advanced design of the CI engines fuelling system			
5. Advanced design of the engines lubricating system			
6. Advanced design of the engine supercharging system			
7. Advanced design of the engines cooling system			
Project theme with one of seven engine System		2 h	

Bibliography

1. Heywood,J.,B. Internal Combustion Engine Fundamentals McGrew-Hill Book Company.1988 ISBN0- 070100499-8;
2. Benson, R., S., Whitehouse, N.,D. Internal combustion Engines Pergamon Press. 1979.ISBN 0-08-02271
3. Jadhao, J., & Thombare, D. (2013). Review on exhaust gas heat recovery for I.C. engine.
4. Tianyou, W., YajunCofaru The turbosteamer: a system introducing the principle of cogeneration in automotive applications. (n.d.).
5. 5. C. Ispas N..a. – Proiectarea motoarelor pentru autovehicule. Universitatea Transilvania Braşov, 1997

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

Requirements of the Romanian Society of Automotive Engineers (SIAR);
- Requirements of the Society of Automotive Engineers (SAE USA);
- SC SCHAEFER - Romania SA;
- SC DACIA GROUP RENAULT SA;
- SC FORD Romania SA;

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Advanced skills and knowledge regarding engines system designing	Written work	60%
	Performing project solving	Project solving	40%
10.5 Seminar/ laboratory/ project	Advanced skills and knowledge regarding engines system designing	Written work	60%
	Performing project solving	Project solving	40%
10.6 Minimal performance standard			
- Elaboration of a topic in the field involving a development / innovation activity - Using advanced knowledge to solve an internal combustion engine system project - Professional realization of a complex project on the calculation and modeling of an ICE system and 3D modeling of the specific assembly - Exam and project marks must be higher than 5.			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024

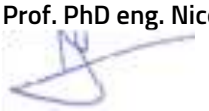
Prof. PhD eng. Ioan Călin ROȘCA

Dean

Prof. Phd eng. Maria Luminița SCUTARU

Head of Department

Prof. PhD eng. Nicolae Ispas



Course holder

Lecturer PhD eng. Sebastian RADU

Holder of seminar/ laboratory/ project

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: FC (fundamental course) / DC (course in the study domain)/ SC (speciality course)/ CC (complementary course); for the Master level, select one of the following options: PC (proficiency course)/ SC (synthesis course)/ AC (advanced course);

4) Course status (attendance type) – select one of the following options: CPC (compulsory course)/ EC (elective course)/ NCPC (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Technical analysis in mechanical engineering					
2.2 Course convenor			Phd. Eng. Doru GROZA					
2.3 Seminar/ laboratory/ project convenor			Phd. Eng. Doru GROZA					
2.4 Study year	I	2.5 Semester	2	2.6 Evaluation type	E	2.7 Course status	Content[3)]	
							Attendance type[4)]	CPCPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**4**	out of which: 3.2 lecture	**2**	3.3 Seminar/laborator/proiect	**0/1/1**
3.4 Total number of hours in the curriculum	**56**	out of which: 3.5 lecture	**28**	3.6. Seminar/laborator/proiect	**0/14/14**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	25
Additional documentation in libraries, specialized electronic platforms, and field research	16
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	20
Tutorial	5
Examinations	3
Other activities	

3.7 Total number of individual learning hours	69
3.8 Total number per semester	125
3.9 Number of credits[4)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• Basic knowledge of mechanical engineering and manufacturing
4.2 competences-related	• Technical abilities

5. Conditions (if applicable)

5.1 for course development	• Lectures are held in rooms with internet access and multimedia teaching equipment
5.2 for seminar/ laboratory/ project development	• The laboratory is carried out in the frame of Schaeffler company

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems L.O.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; L.O.1.2. The graduate can analyze the principles that must be used in the development of technical projects L.O.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;
Transversal competences	C2. The ability to apply simulation and testing methods for propulsion systems and to use specialized programs for design (CAD/CAE) L.O.2.1. The graduate can simulate the behavior of propulsion system models based on specialized software; L.O.2.2. The graduate can develop test protocols and interpret and analyze data collected during testing to formulate conclusions and solutions. L.O.2.3. The graduate can develop, design and make prototypes for the evaluation of propulsion equipment tests; L.O.2.4. The graduate can use assisted engineering software specific to the design of propulsion systems (dedicated software for CAE). L.O.2.5. The graduate can use computer-aided design systems (dedicated CAD software);

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• The course aim is to provide the basics of technical analysis method that lead to establishment of optimization measures for new products
7.2 Specific objectives	Students will acquire cognitive skills, such as: • To do prototype parts analysis for development of products based on various methods; • To do correlation of results obtained from tests with product specifications • To do statistical analysis of data

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
Chapter 1 - Prototype parts analysis of the development of products using various methods (measurements of geometric and material property determination, analysis wear by various optical methods, etc.).	Interactive course, debates, case studies	10h	
Chapter 2 - Correlation of results obtained from tests with product specifications for the establishment of optimization measures		6h	
Chapter 3 - Competitive product analysis activities and establishing product development strategy.		4h	
Chapter 4 - Product testing following factors durability and functionality of products and mechatronic systems		4h	
Chapter 5 - Statistical analysis of data		4h	
Bibliography Documentation provided by the company Schaeffler Romania			
8.2 Laboratory	Teaching-learning methods	Number of hours	Remarks
1. Measurements of geometric and material property determination, analysis wear by various optical methods.	Practical activuty	4h	
2. Correlation of results obtained from tests with product specifications		2h	
3. Establishing product development strategy. Case of study		4h	

4. Statistical analysis of data		4h	
Bibliography Documentation provided by the company Schaeffler Romania			
8.3 Project	Teaching-learning methods	Number of hours	Remarks
1. Define the subject of the project	Debates	2h	
2. Prototype parts analysis of the development of products – types of measurements		2h	
3. Correlation analysis of the obtained results from tests with product specifications for the establishment of optimization measures		4h	
4. Data analysis		4h	
5. Project presentation		2h	
Bibliography Documentation provided by the company Schaeffler Romania			

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers)

The graduate students will be able to do technical analysis in the company where they are employed.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Correct use and application of key theoretical concepts	Written evaluation	60%
10.5 Project	Project evaluation	Disscusion	40%
10.6 Minimal performance standard			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024

Prof.dr.ing. Ioan Călin, ROȘCA

Dean

dr. ing. Doru GROZA,

Course holder

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

dr. ing. Doru GROZA,

Holder of laboratory and project

Note:

1) Field of study – select one of the following options: BA/MA/PhD. (to be filled in according to the forceful classification list for study programmes);

2) Study level – *choose from among:* BA/MA/PhD.;

3) Course status (content) – *for the BA level, select one of the following options:* **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); *for the MA level, select one of the following options*: **PC** (proficiency course)/ **SC** (synthesis course)/ **AC** (advanced course)

4) Course status (attendance type) – *select one of the following options:* **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-

compulsory course);

[5] One credit is the equivalent of 25 – 30 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study Master[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Integrated Practical Methods in Propulsion Systems Engineering

2. Data about the course

2.1 Name of course			Design for manufacturing					
2.2 Course convenor			Prof. dr. eng. Mircea Viorel DRĂGOI					
2.3 Seminar/ laboratory/ project convenor			Lect. dr. eng. Sever HABA					
2.4 Study year	I	2.5 Semester	II	2.6 Evaluation type	E	2.7 Course status	Content[3)]	DS
							Attendance type[4)]	DO

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**2**	out of which: 3.2 lecture	**1**	3.3 seminar/ laboratory/ project	**0/0/1**
3.4 Total number of hours in the curriculum	28	out of which: 3.5 lecture	14	3.6 seminar/ laboratory/ project	0/0/14

Time allocation	hours
Study of textbooks, course support, bibliography and notes	14
Additional documentation in libraries, specialized electronic platforms, and field research	14
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	42
Tutorial	0
Examinations	2
Other activities.....	

3.7 Total number of hours of student activity	72
3.8 Total number per semester	**100**
3.9 Number of credits[5)]	4

4. Prerequisites (if applicable)

4.1 curriculum-related	• Manufacturing technologies, Tolerances.
4.2 competences-related	• Ccrrelating the knowledge, principles, and methods in technical sciences of the study domain with graphical representations, to solve the specific tasks • Using the software applications and digital technologies to solve the specific tasks of mechanical engineering, in general, and particularly for CAD of products.

5. Conditions (if applicable)

5.1 for course development	• Computer and beamer
5.2 for seminar/ laboratory/ project development	• Beamer, computers, and specific software

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems LO.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; LO.1.2. The graduate can analyze the principles that must be used in the development of technical projects LO.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;
Transversal competences	

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• The advanced knowing and applying by students the principles of design for manufacturing
7.2 Specific objectives	• Knowing the basic criteria the defining of machinability of the industrial parts is based on • Knowing and application of the principles of designing the allowances and surface quality • Correct handling of the concepts of part family and group technology • Knowing and applying correctly the principles of pats design to be manufactured by additive technologies

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
DFM Principles	Presentation	1	
Concurrent/simultaneous engineering		1	
Particularities of designing parts for additive technologies	Presentation + Case study	4	
The ISO system of deviations and allowances	Presentation + Conversation, Demonstration, Exercises, Debate	4	
Design of fits		2	
Dimensional chains and dimensioning the assemblies		2	

Bibliography

1. Molloy, O., Warman, E.A., Tilley, S., Design for Manufacturing and Assembly Concepts, architectures and implementation, 1998, XVII, eBook. 205 p. ISBN 978-1-4615-5785-2
2. Boothroyd, G,, Dewhurst, P., Knight, W. K., Product Design for Manufacture and Assembly, Third Edition (Manufacturing Engineering and Materials Processing) Hardcover – December 8, 2010, ISBN-13: 978-1420089271 ISBN-10: 1420089277 Edition: 3rd
3. Anderson, D. M., Design for Manufacturability: How to Use Concurrent Engineering to Rapidly Develop Low-Cost, High-Quality Products for Lean Production Hardcover – February 4, 2014, ISBN-13: 000-1482204924 ISBN-10: 1482204924 Edition: 1st
4. http://me.gatech.edu/files/capstone/L071ME4182DFA
5. http://www.calpoly.edu/~fowen/me428/Design%20for%20Manual%20Assembly%20Lecture%20Rev%204.pdf
6. http://www.design-iv.com
7. http://designengineusa.com/storage/design_for_manufacture_and_assembly.pdf

8.2. Project	Teaching methods	Number of hours	Remarks
The project subjects are oriented to designing a part according to DFM principles and taking into account the machinability criteria	Individual work under assistance	14	

Bibliography

1. Molloy, O., Warman, E.A., Tilley, S., Design for Manufacturing and Assembly Concepts, architectures and implementation, 1998, XVII, eBook. 205 p. ISBN 978-1-4615-5785-2
2. Boothroyd, G,, Dewhurst, P., Knight, W. K., Product Design for Manufacture and Assembly, Third Edition (Manufacturing Engineering and Materials Processing) Hardcover – December 8, 2010, ISBN-13: 978-1420089271 ISBN-10: 1420089277 Edition: 3rd
3. Anderson, D. M., Design for Manufacturability: How to Use Concurrent Engineering to Rapidly Develop Low-Cost, High-Quality Products for Lean Production Hardcover – February 4, 2014, ISBN-13: 000-1482204924 ISBN-10: 1482204924 Edition: 1st

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

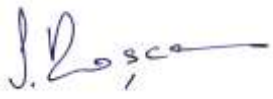
The contents of the subject meet the requirements of the companies from Brașov region on the graduate of the study program

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Applying the dimensioning principles of individual parts and fits, dimensional chains	Written assessment with objective items	25%
10.5 Seminar/ laboratory/ project	Project evaluation	Defending the project	50%
	Application. Design of allowances and fits	Solving problems	25%
10.6 Minimal performance standard			
• Solving a problem clearly defined (analysys of situation) of an average complexity in the area of DFM			

This course outline was certified in the Department Board meeting on 27.09.2024 and approved in the Faculty Board meeting on 30.09.2024

Prof. dr. ing. Călin Ioan ROȘCA



Dean

Prof. dr. ing. Luminița Maria SCUTARU

Head of Department

Prof. dr. ing. Mircea-Viorel DRĂGOI

Course holder

Șef lucr. dr. ing . Sever HABA

Holder of seminar/ laboratory/ proiect

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

[2] Study level – choose from among: Bachelor / Master / Doctorat;

[3] Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

[4] Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

[5] One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study Master[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Integrated Practical Methods in Propulsion Systems Engineering (English)

2. Data about the course

2.1 Name of course			Computer Aided Numerical Control					
2.2 Course convenor			Prof. dr. eng. Mircea Viorel DRĂGOI					
2.3 Seminar/ laboratory/ project convenor			Prof. dr. eng. Mircea Viorel DRĂGOI					
2.4 Study year	I	2.5 Semester	II	2.6 Evaluation type	E	2.7 Course status	Content[3)]	SC
							Attendance type[4)]	EC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**2**	out of which: 3.2 lecture	**1**	3.3 seminar/ laboratory/ project	**0/0/1**
3.4 Total number of hours in the curriculum	28	out of which: 3.5 lecture	14	3.6 seminar/ laboratory/ project	0/0/14

Time allocation	hours
Study of textbooks, course support, bibliography and notes	14
Additional documentation in libraries, specialized electronic platforms, and field research	14
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	42
Tutorial	0
Examinations	2
Other activities.....	-

3.7 Total number of hours of student activity	72
3.8 Total number per semester	100
3.9 Number of credits[5)]	4

4. Prerequisites (if applicable)

4.1 curriculum-related	• Manufacturing technologies,.
4.2 competences-related	• Use of software packages to apply principles and methods from the technical sciences of the field

5. Conditions (if applicable)

5.1 for course development	• Computer and beamer
5.2 for seminar/ laboratory/ project development	• Computer, Beamer, laboratory endowed with CNC machine-tools

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems R.Î.1.1. The graduate can design sketches and design elements necessary for the development and communication of design concepts; R.Î.1.2. The graduate can analyze the principles to be used in the development of technical projects R.Î.1.3. The graduate can use technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;
Transversal competences	

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Advanced knowledge and application by students of the principles of programming numerically controlled machine tools
7.2 Specific objectives	• Knowledge and application of the principles of the technology of manufacturing parts manufacturing • Correct handling of G functions

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
Presentation of course objectives, general and introductory concepts, definitions	Presentation	1	
CNC equipment classification		1	
Coordinate systems.. SCMU, CSP	Presentation + Case study	2	
Organization of numerical control files.. Classification of addresses/functions		1	
Geometric addresses, technological addresses, other addresses	Presentation + Conversation, Demonstration, Exercises, Debate	1	
G codes		6	
Drilling cycles		2	

Bibliography

1. *** The CNC Milling machine NOVAMILL CNC. User's Manual (electronic format)
2. DRĂGOI M. V. .Computer aided numerical control. Course notes 2020-2024.
3. CNC macining cente Victor VC55 - User's manual.
4. Course support in electronic format available on E-learning platform of Transilvania University of Braşov
5. STENERSON, J., CURRAN, K., Computer Numerical Control: Operation and Programming. Prentice Hall, 2007
6. http://www.pantura-project.eu/Downloads/Application_of_a_Design_Method_for_Manufacture_and_Assembly_WP4_Master's%20Thesis%20201229.pdf http://designengineusa.com/storage/design_for_manufacture_and_assembly.pdf

8.2. Project	Teaching methods	Number of hours	Remarks
The project subjects are oriented towards the development of manufacturing technology and numerical control programs for milling processing of medium complexity parts.	Individual work under assistance	14	

Bibliography

1. *** The CNC Milling machine NOVAMILL CNC. User's Manual (electronic format)
2. DRĂGOI M. V. .Computer aided numerical control. Course notes 2020-2024.
3. CNC macining cente Victor VC55 - User's manual.
4. Course support in electronic format available on E-learning platform of Transilvania University of Braşov
5. STENERSON, J., CURRAN, K., Computer Numerical Control: Operation and Programming. Prentice Hall, 2007
6. http://www.pantura-project.eu/Downloads/Application_of_a_Design_Method_for_Manufacture_and_Assembly_WP4_Master's%20Thesis%20201229.pdf http://designengineusa.com/storage/design_for_manufacture_and_assembly.pdf

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

The contents of the subject meet the requirements of the companies from Brașov region on the graduate of the study program

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Assessment of the ability to synthesize knowledge from various chapters	Written assesment	35%
	Assessment of the ability to use theoretical knowledge	Written assesment	15%
10.5 Seminar/ laboratory/ project	Application. Development of a numerical control program for contouring by milling	Written assesment	50%
10.6 Minimal performance standard			
• Basic use of theoretical knowledge for developing numerical control programs (minimum grade 5 in the project evaluation)			

This course outline was certified in the Department Board meeting on 27.09.2024 and approved in the Faculty Board meeting on 30.09.2024

Prof. dr. ing. Călin Ioan ROȘCA

Dean

Prof. dr. ing. Luminița Maria SCUTARU

Head of Department

Prof. dr. ing. Mircea-Viorel DRĂGOI

Course holder

Prof. dr. ing. Mircea-Viorel DRĂGOI

Holder of seminar/ laboratory/ proiect

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Professional intership					
2.2 Course convenor								
2.3 ~~Seminar/ laboratory/~~ project convenor								
2.4 Study year	I	2.5 Semester	2	2.6 Evaluation type	C	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**12**	out of which: 3.2 lecture		3.3 Project	**12**
3.4 Total number of hours in the curriculum	**168**	out of which: 3.5 lecture		3.6. Project	**168**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	-
Additional documentation in libraries, specialized electronic platforms, and field research	50
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	70
Tutorial	28
Examinations	2
Other activities.....	20

3.7 Total number of individual learning hours	-
3.8 Total number per semester	-
3.9 Number of credits[4)]	**6**

4. Prerequisites (if applicable)

4.1 curriculum-related	
4.2 competences-related	• To be able to do projects

5. Conditions (if applicable)

5.1 for course development	
5.2 for seminar/ laboratory/ project development	• In the University laboratories and in the frame of Schaeffler Romania Company.

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems L.O.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; L.O.1.2. The graduate can analyze the principles that must be used in the development of technical projects L.O.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. L.O.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the activity of conception, calculation and design of a propulsion system/mechanical system.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• To do a project / semester that demonstrate engineering skills acquired during the first year semester
7.2 Specific objectives	• Improving knowledge acquired in the two semesters of the first year

8. Content

8.1 Project	Teaching methods	Remarks
Identify issues for project practice	Individual or team work	
Establishing project design practice		
Identification of development directions of the theme		
Analysis of the actual situation		
Determination of the solutions encountered problems		
Presentation of projects		

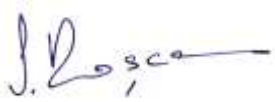
9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers)

The topic is made with the company Schaeffler Romania is centered on a theme of its own

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course			
10.5 Project	Scientofic level of the project	Oral presentation	100%
10.6 Minimal performance standard			
• Students must prove, by design, the properties of terms and technical foundations.			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024.

Prof.dr.ing. Ioan Călin, ROȘCA	**Prof.dr.ing. Maria Luminița, SCUTARU**
	
Dean	**Head of Department**
Course holder	Holder of project
Not the case	Individual holder

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transylvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical engineering
1.4 Field of study[1)]	Mechanical engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Practical methods in propulsion systems engineering

2. Data about the course

2.1 Name of course			Advanced Manufacturing Technology					
2.2 Course convenor			Conf.dr.ing.Lepadatescu Badea					
2.3 Seminar/ laboratory/ project convenor			Conf.dr.ing.Lepadatescu Badea					
CPC2.4 Study year	II	2.5 Semester	I	2.6 Evaluation type	E	2.7 Course status	Content[3)]	Ac
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**4**	out of which: 3.2 lecture	**2**	3.3 Project	**2**
3.4 Total number of hours in the curriculum	56	out of which: 3.5 lecture	28	3.6 Project	28

Time allocation	hours
Study of textbooks, course support, bibliography and notes	35
Additional documentation in libraries, specialized electronic platforms, and field research	15
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	10
Tutorial	5
Examinations	4
Other activities.....	

3.7 Total number of hours of student activity	69
3.8 Total number per semester	125
3.9 Number of credits[5)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• Technical drawing. Tolerances and fits. Devices. Machine tool.
4.2 competences-related	• Design of road vehicle manufacturing technologies

5. Conditions (if applicable)

5.1 for course development	• Classroom with blackboard and video projector
5.2 for seminar/ laboratory/ project development	• Laboratory room with technological equipment related to manufacturing processes. • Guidelines for design and laboratory

6. Specific competences and learning outcomes

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems R.Î.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; R.Î.1.2. The graduate can analyze the principles that must be used in the development of technical projects R.Î.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems; C2. The ability to apply simulation and testing methods for propulsion systems and to use specialized programs for design (CAD/CAE) R.Î.2.1. The graduate can simulate the behavior of propulsion system models based on specialized software; R.Î.2.2. The graduate can develop test protocols and interpret and analyze data collected during testing to formulate conclusions and solutions. R.Î.2.3. The graduate can develop, design and make prototypes for the evaluation of propulsion equipment tests;
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering R.Î.1.1 The graduate can adequately use specialized information in professional communication. R.Î.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. R.Î.1.3 The graduate has the ability to coordinate the activity of conception, calculation and design of a propulsion system/mechanical system. CT2. Autonomy and critical thinking R.Î.2.1 The graduate develops his own way of solving a task, working motivated, with little or no supervision. R.Î.2.2 The graduate has autonomy in making technical decisions or those related to the management of design activities R.Î.2.3 The graduate has the ability to ensure the quality of a mechanical structure and mechanical product/system.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Assimilation and application of the knowledge and terminology specific to the design of the technological processes of machining operations for various parts of the components of motor vehicles.
7.2 Specific objectives	• Defining and acquiring the concepts and terminology specific to the design of machining operations • Choosing the optimal processing option; Designing plans for machining operations.

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
1. Flow forming	Exposure, interactive course	2	
2. Flow drilling		2	
3. Thread forming		2	
4. Roller burnishing		2	
5. Superfinishing manufacturing process		2	
6. Honing manufacturing process		2	
7. Shaving manufacturing process		2	

8. Lapping manufacturing process	Exposure, interactive course	2	
9. Centreless grinding		2	
10. Plastic forming of spline shafts		2	
11. Grinding by RON- Centric technology		2	
12. Gear manufacturing by cold forming		2	
13. Laser honing process		2	
14. Skiving and roller burnishing.		2	

Bibliography

1. Lepădătescu, B., Zeleniuc O., - Material removal processes and machines. Editura Universitatii Transilvania din Brasov, 2010.
2. Lepădătescu, B., Simon, A.E. – Vehicles manufacturing. Editura Universitatii Transilvania din Brasov, 2006.
3. Lepădătescu, B; Popa Luminita; Buzatu Constantin. - Automatizarea Proceselor Tehnologice Industriale. Editura MATRIX ROM, Bucuresti, 2015.

8.2 Project	Teaching-learning methods	Number of hours	Remarks
1. Establishment of technical conditions of dimensional and geometric precision of some specific parts of the automotive industry	Lecture + conversation. Independent study. Group consultations. Conversation + argumentation. Final drafting	6	
2. Establish succession (possible variants) of the operations / processing phases for machining a workpiece of automotive industry		8	
3. Technological design calculations (stock removal, cutting parameters, machining time).		8	
4. Designing the operating plan for machining operations for a workpiece from motor vehicle component.		6	

Bibliography

1. Picos, C., Coman, Gh., Dobre, N., Pruteanu, O., Rusu, C., Trufinescu, St. – Normarea tehnica pentru prelucrari prin aschiere. Vol.1 si 2. Editura Tehnica, Bucuresti, 1982.
2. Vlase, A., Sturzu, A., Mihail, A., Bercea, I. – Regimuri de aschiere, adaosuri de prelucrare si norme tehnice de timp. Editura Tehnica, Bucuresti, 1985.
3. Draghici, G., Buzatu, C. – Indrumar pentru lucrari practice de laborator TCM. Editura Uniuversitatii din Brasov, 1978.
4. Buzatu, C., Lepadatescu, B. – Tehnologii si echipamente de fabricatie. Indrumar de laborator. Universitatea Transilvania din Brasov, 1999

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

- The course is in line with the current national and international development and evolution requirements of higher technical engineering in mechanical engineering.
- The curriculum course is integrated into the engineering programs associated with mechanical engineering and is correlated with similar study programs in European universities. To obtain a good insertion of the graduates in the profile companies, their structure and the suggestions from INA SCHAFFLER Brasov with which the university collaborates.
- Ensure the competent students and abilities in accordance with the provisions of the National Qualifications Framework in higher education through a suitable scientific and technical training at the master level, allowing the gradual insertion of graduates into the labour market, as well as the possibility of continuing studies through doctoral programs.
- The study program is part of Transylvania University Brasov's policy and strategy regarding the professional training mission, both in terms of its structure and content, following the international developments and standards, as well as the approach of a rigorous, efficient and effective work strategy responsible.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	1. Assimilation of specific concepts and terms used in the design of technological processes. 2. Correct explanation of technological processes for processing products from the automotive industry. 3. Comparative analysis of possible technological processes to be used under given conditions	Written evaluation based on subjective items.	50%
	Present at the course	It is recorded at the course.	10%
10.5 Project	1. Appropriate use of concepts and terminology specific to the course. 2. Correct argumentation of solutions and results obtained in design.	Exposure, application activity. Problem solving. Writing of the project + argumentation of used solutions	40%
10.6 Minimal performance standard			
• Develop a theme in the field that involves development / innovation activity.			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024.

Prof.dr.ing. Ioan Calin ROSCA

Dean

Prof.dr.ing.habil Maria Luminita SCUTARU

Head of Department

Conf.dr.ing.Badea LEPADATESCU

Course holder

Conf.dr.ing Badea LEPADATESCU

Holder of project

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes)

2) Study level – choose from among: Bachelor / Master / Doctorat

3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course)

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course)

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Practical methods integrated in propulsion systems engineering

2. Data about the course

2.1 Name of course			Automation in Manufacturing					
2.2 Course convenor			Lepadatescu Badea					
2.3 Seminar/ laboratory/ project convenor			Lepadatescu Badea					
2.4 Study year	II	2.5 Semester	I	2.6 Evaluation type	E	2.7 Course status	Content[3)]	AC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**3**	out of which: 3.2 lecture	**2**	3.3 Laboratory	**1**
3.4 Total number of hours in the curriculum	42	out of which: 3.5 lecture	28	3.6 Laboratory	14

Time allocation	hours
Study of textbooks, course support, bibliography and notes	**20**
Additional documentation in libraries, specialized electronic platforms, and field research	**30**
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	**20**
Tutorial	**10**
Examinations	**3**
Other activities.....	

3.7 Total number of hours of student activity	83
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• Manufacturing Technology; Automation in Manufacturing Technology.
4.2 competences-related	• Appropriate use of fundamental concepts in the field of motor vehicle engineering • Design and automation of manufacturing technologies for road vehicles

5. Conditions (if applicable)

5.1 for course development	• Classroom with blackboard and video projector
5.2 for seminar/ laboratory/ project development	• Laboratory room with blackboard; Apparatus and devices used in the automation of technological processes; Laboratory guideline

6. Specific competences and learning outcomes

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems L.O.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; L.O.1.2. The graduate can analyze the principles that must be used in the development of technical projects L.O.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems; C2. The ability to apply simulation and testing methods for propulsion systems and to use specialized programs for design (CAD/CAE) L.O.2.1. The graduate can simulate the behavior of propulsion system models based on specialized software; L.O.2.2. The graduate can develop test protocols and interpret and analyze data collected during testing to formulate conclusions and solutions. L.O.2.3. The graduate can develop, design and make prototypes for the evaluation of propulsion equipment tests;
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. L.O.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the activity of conception, calculation and design of a propulsion system/mechanical system. CT2. Autonomy and critical thinking L.O.2.1 The graduate develops his own way of solving a task, working motivated, with little or no supervision. L.O.2.2 The graduate has autonomy in making technical decisions or those related to the management of design activities L.O.2.3 The graduate has the ability to ensure the quality of a mechanical structure and mechanical product/system.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Assimilation and application of knowledge and terminology specific to the design and verification of systems for the automation of manufacturing technologies for components in road vehicles
7.2 Specific objectives	• Definition of processing and control elements of process automation elements • Study of electro pneumatic controls in automation of technologies on production lines • Using the automatic feeding of small workpieces for machine tools • Examples of automation of technological processes for parts of motor vehicle components.

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
1. Energy sources used in automation of technological processes. 1.1 Advantages of using compressed air. 1.2 Compressed air supply; 1.3 Preparation of compressed air	Lecture, Case studies Debates on specific issues	2	
2. Symbols and notations used in pneumatics. 2.1 Structure of a planetary scheme; 2.2 Classification of kinematic schemes; 2.3 Cycle of a cinematic scheme	Lecture, Case studies Debates on specific issues	2	
3. Control elements used in the automation of technological processes. 3.1 Pneumatic distributors; 3.2 Classification of distributors; 3.3 Shock absorbers.	Lecture, Case studies Debates on specific issues	2	

4. Processing elements for automation of technological processes. 4.1 Selection valves; 4.2 Combined valves; 4.3 Timing valves	Lecture, Case studies Debates on specific issues	2	
5. Control of actuators in automation systems. 5.1 Direct command; 5.2 Indirect command; 5.3 Modular automatic processing units	Lecture, Case studies Debates on specific issues	2	
6. Execution elements used in the automation of parts manufacturing. 6.1 Linear pneumatic engine; 6.2 Pneumatic rotary motors; 6.3 Pneumatic separators; 6.4 Fluid muscles; 6.5 Indexable rotary tables; 6.6 Handling and assembly modules	Lecture, Case studies Debates on specific issues	2	
7 Handling elements. 7.1 Grippers; 7.2 Vacuum handling equipment	Lecture, Case studies Debates on specific issues	2	
8. Electropneumatic control in the automation of technological processes. 8.1 the chain of command; 8.2 Switches and switches; 8.3 Switching, time and pressure relays; 8.4 Electrical control of distributors; 8.5 Logical operators	Lecture, Case studies Debates on specific issues	2	
9. Elements of electromechanical execution in the automation of technological processes. 9.1 Rotary electrical module; 9.2 Rotary electrical linear mode; 9.3 Electric cylinder with guide screw; 9.4 Electric powered mini- 9.5 Motor shafts with toothed belt and console; 9.6 Linear electric mode; 9.7 Linear motor electric cylinder	Lecture, Case studies Debates on specific issues	2	
10. Automation of semi-finished machine supply of machine tools. 10.1 Selecting power systems; 10.2 Flexible guidance and feeding systems; 10.3 Bunker feeding devices; 10.4 Parts orientation technology	Lecture, Case studies Debates on specific issues	2	
11. Optical processing in the automation of technological processes. 11.1 Orientation of parts using optical detection technology; 11.2 Detection devices; 11.3 Programming of optical detection of orientation and sorting devices; 11.4 Orientation and sorting of mixed parts; 11.5 Optical processing systems.	Lecture, Case studies Debates on specific issues	2	
12. The GRAFCET concept used in the automation of technological processes. 12.1 Simulation and evolution of a GRAFCET; The basic structure of a GRAFCET; 12.2 Particular configurations; 12.3 GRAFCET equations; 12.4 GRAFCET Cases	Lecture, Case studies Debates on specific issues	2	
13. Ladder language used in the automation of technological processes. 13.1 Introduction; 13.2 Creating a Program Line; 13.3 Ladder connections; 13.4 Ladder application examples	Lecture, Case studies Debates on specific issues	2	
14. Examples of automation applications in manufacturing processes.	Lecture, Case studies Debates on specific issues	2	

Bibliography

1. Lepadatescu, B; Popa Luminita; Buzatu Constantin., - Automatizarea Proceselor Tehnologice Industriale. Editura MATRIX ROM, Bucuresti, 2015.
2. Chiriacescu, S, T., – Automatizarea proceselor tehnologice. Editura Universitatii din Brasov, 1975.
3. Hanganut, M., - Automatica. Editura didactica si pedagogica, Bucuresti, 1971.

8.2 Laboratory	Teaching-learning methods	Number of hours	Remarks
1. Automate the sorting of parts by an external dimension	Individual measurements; Problem solving; Conversations and experimenting individually and in small groups Self-evaluation and inter-evaluation	2	
2. Automated control and sorting by size groups		2	
3. Study of systems for the simulation of the automation of the semi-finished food supply in pieces of the machine tools		2	
4. Automatic machine tool feeding		2	
5. Simulate the operation of a flexible manufacturing system		2	
6. Model for the study and simulation of electric actuators and servomotors		2	
7. Distribution, testing and processing station		2	

Bibliography

1. Lepadatescu, B; Buztau, C., - Automatizarea Proceselor Tehnologice. Indrumar de laborator; Universitatea Transilvania din Brasov, 2016.
2. Buzatu, C., – Automatizarea si robotizarea proceselor tehnologice. Universitatea din Brasov, 1988.
3. Spineanu, U., – Automatizarea controlului dimensiunilor in constructia de masini. Editura Tehnica, Bucuresti, 1987.

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

Theoretical and applied knowledge base the newest approaches in designing the automation of technological processes, and the practical examples are based on representative types of products specific to vehicle motors.

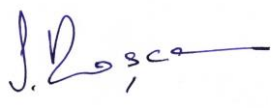
10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Correct explanation of specific design situations for the automation of technological processes	Written evaluation with subjective items Essays on concrete topics	15%
	Correct explanation of the operation of some measurement and control automation systems	Problem solving.	15%
	Problem solving		10%
	Recognizing some elements of symbolizing the automation of technological processes in the technical drawing.		10%
	Present at the course	It is recorded during the semester.	10%

10.5 Laboratory	Appropriate use of concepts specific to the automation of technological processes Applying individual and group work techniques in automation of manufacturing technologies.	Individual activity of using automation elements Problem solving	20% 20%
10.6 Minimal performance standard			
• Operations with theoretical and applied concepts of the course.			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024

Prof.dr.ing. Ioan Călin, ROȘCA

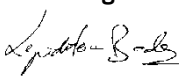


Dean

Prof.dr.ing. Maria Luminița, SCUTARU

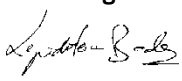
Head of Department

Conf.dr.ing. Badea LEPADATESCU



Course holder

Conf.dr.ing. Badea LEPADATESCU



Holder of Laboratory

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes)

2) Study level – choose from among: Bachelor / Master / Doctorat

3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course)

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course)

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study Master[1)]	Mechanical engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Metode practice integrate în ingineria sistemelor de propulsie (RO) / Integrated practical methods in propulsion systems engineering (EN)

2. Data about the course

2.1 Name of course			Product Development					
2.2 Course convenor			Lecturer Phd.eng. HABA Sever-Alexandru					
2.3 Seminar/ laboratory/ project convenor			Lecturer Phd.eng. HABA Sever-Alexandru					
2.4 Study year	II	2.5 Semester	I	2.6 Evaluation type	E	2.7 Course status	Content[3)]	SC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**3**	out of which: 3.2 lecture	**2**	3.3 seminar/ laboratory/ project	**1**
3.4 Total number of hours in the curriculum	42	out of which: 3.5 lecture	28	3.6 seminar/ laboratory/ project	14

Time allocation	hours
Study of textbooks, course support, bibliography and notes	15
Additional documentation in libraries, specialized electronic platforms, and field research	10
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	42
Tutorial	14
Examinations	2
Other activities.....	

3.7 Total number of hours of student activity	83
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• Bachelor's degree in engineering
4.2 competences-related	• Associating knowledge, principles and methods from the technical sciences of the field with graphic representations for solving specific tasks • Use of software applications and digital technologies to solve tasks specific to industrial engineering, in general, and for assisted product design in particular

5. Conditions (if applicable)

5.1 for course development	• Classroom with computer and video projector
5.2 for seminar/ laboratory/ project development	• Laboratory with video projector, computers, appropriate software and study parts from automotive engineering

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems LO.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; LO.1.2. The graduate can analyze the principles that must be used in the development of technical projects LO.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;
Transversal competences	CT2. Autonomy and critical thinking L.O.2.1 The graduate develops his own way of solving a task, working motivated, with little or no supervision. L.O.2.2 The graduate has autonomy in making technical decisions or those related to the management of design activities L.O.2.3 The graduate has the ability to ensure the quality of a mechanical structure and mechanical product/system. L.O.2.4 The graduate can develop efficient and responsible work strategies, applying the principles, norms and values of the code of professional ethics. L.O.2.5 The graduate has the ability to objectively self-assess the need for lifelong training, the use of information and communication in an international language for the purpose of insertion into the labor market and continuous adaptation to its requirements.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• The graduate can analyze the principles that must be used in the development of technical projects
7.2 Specific objectives	• Advanced knowledge and application by students of the principles of Integrated Design and Manufacture of Industrial Products • Knowledge and application of specific design norms as well as legal provisions • Identifying from the concept phase and optimizing the main areas of industrial parts that can generate increased technological manufacturing costs

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
Introductory elements	Lecture + case study + debate	2	Lecture based on slides
Industrial products made of injected plastics/injected light alloys.v	Lecture + case study + debate	2	Lecture based on slides and pieces from the laboratory
The temporary stages of development of the design and manufacture of an industrial product	Lecture + case study + debate	2	Lecture based on slides
Introduction to the manufacture of parts made of thermoplastic materials injected into molds	Lecture + case study + debate	2	Lecture based on slides
Production of injected plastic parts from the automotive field (specific conditions for visible parts and functional parts)	Lecture + case study + debate	2	Lecture based on slides
Making parts of the passenger compartment of cars: additional technologies	Lecture + case study + debate	2	Lecture based on slides

Acquisition of the contract for the development and manufacture of an industrial product in the field of interior components of a high-performance vehicle.	Lecture + case study + debate	2	Lecture based on slides
Digital manufacturing of industrial products in the context of Industry 4.0, 5.0	Lecture + case study + debate	2	Lecture based on slides
Development directions in the context of AI implementation, virtual spaces and Metaverse	Lecture + case study + debate	2	Lecture based on slides
Finite element analysis implemented in the simulation for validation of mechanical parts injected from thermoplastic materials	Lecture + case study + debate	2	Lecture based on slides and pieces from the laboratory
Dedicated PLM platforms used in product development	Lecture + case study + debate	2	Lecture based on slides
Prototypes for mechanical industrial products definition, classification, details of use, methods of obtaining	Lecture + case study + debate	2	Lecture based on slides and pieces from the laboratory
Physical prototypes and digital prototypes	Lecture + case study + debate	2	Lecture based on slides and pieces from the laboratory
DFM (Design For Manufacturing) analysis for parts made of plastic materials injected into molds - case study	Lecture + case study + debate	2	Lecture based on slides

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3. ***, (2010), Selective LASER Melting (SLM) of pure gold, Gold Buletin, 2010, Volume 43, Number 2, p. 114-121, http://springerlink.com
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5. PETER, H., (2008), Rapid Prototyping & Manufacturing Research, www.student.tue.nl/q/p.r.hermans
6. Technology EDM http://sodick-edm.ro
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8. http://injectionmoldingmold.wholesale.wneducation.com
9. http://www.redecos.in/dfm.html
10. www.unitedbmw.com/detail-2019-bmw-7_series
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12. www.3dhubs.com/knowledge-base/introduction-fdm-3d-printing

8.2 Seminar/ laboratory/ project	Teaching-learning methods	Number of hours	Remarks
Proposals for drawing up the specifications related to the industrial product to be produced	Case study + debate	1	Lecture based on slides and laboratory parts
Analysis of the geometry imposed by the customer, establishment of the main technical characteristics, Establishment of the manufacturing technology, Establishment of the main dangerous areas	Case study + debate	1	Lecture based on slides and laboratory parts

The establishment of the main dangerous areas that from the concept phase must be optimized so as not to lead to risks for the manufacturer of this part;	Case study + debate	1	Lecture based on slides and laboratory parts
Establishing the main operating characteristics for the assembly of an electrically operated curtain on the rear door;	Case study + debate	1	Lecture based on slides and laboratory parts
Analysis of the geometry of the inner door panel type piece, establishing the main technical characteristics, Establishing the manufacturing technology	Case study + debate	1	Lecture based on slides and laboratory parts
Establishing the main operating characteristics for the assembly of a central console for a motor vehicle;	Case study + debate	1	Lecture based on slides and laboratory parts
Analysis of the geometry of the box assembly part of the central console of the vehicle, establishing the main technical characteristics, Establishing the manufacturing technology	Case study + debate	1	Lecture based on slides and laboratory parts
The stages of designing the geometry of a part made of injected plastics from the field of motor vehicles - the part with visible surfaces such as the Instrument Panel in the area of the Dashboard of a motor vehicle.	Case study + debate	1	Lecture based on slides and laboratory parts
The stages of designing the geometry of a part made of injected plastics from the field of motor vehicles - the functional part of the type Guide for the control cable	Case study + debate	1	Lecture based on slides and laboratory parts
Analysis of the geometry of the Air Nozzle Ornament type piece	Case study + debate	1	Lecture based on slides and laboratory parts
Analysis of the geometry of the piston part for spark ignition engines, establishing the main technical characteristics	Case study + debate	1	Lecture based on slides and laboratory parts
The stages of designing the geometry of a part made of injected plastics from the field of motor vehicles - the functional part of the type Guide for the control cable.	Case study + debate	1	Lecture based on slides and laboratory parts
Establishing the main operating characteristics for the assembly of a fuzeta assembly	Case study + debate	1	Lecture based on slides and laboratory parts
Establishing the main operating characteristics of an oversized bearing;	Case study + debate	1	Lecture based on slides and laboratory parts

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5. www.macauto-group.com/automotive-interiors-macauto
6. www.alfaromeousaofevanston.com
7. www.autobics.com/2018/02/2018-maserati-levante
8. www.acornbearings.co.uk

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

The contents of the discipline meet the request of the companies in the Brașov industrial area regarding the skills expected of the graduates of the study program in respect of the principles of design oriented towards the manufacture of industrial parts.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Evaluarea nivelului de cunostiinte privind Dezvoltarea de produse industriale	Oral evaluation with subjective items, applied individually	50%
10.5 Seminar/ laboratory/ project	Establishing the main operating characteristics for an industrial product	Oral evaluation with subjective items, applied individually	50%
	Evaluation of the level of knowledge regarding the Development of industrial products	Oral evaluation with subjective items, applied individually	50%
10.6 Minimal performance standard			
• Solving a well-defined theme in the field of design and manufacture of industrial products, of medium complexity. • Carrying out the analysis of the parts geometry as well as finding design and manufacturing solutions.			

This course outline was certified in the Department Board meeting on 27.09.2024 and approved in the Faculty Board meeting on 30.09.2024.

Prof. dr. ing. Călin Ioan ROȘCA

Dean

Ph.D.eng. Sever-Alexandru HABA

Course holder

Prof. dr. ing. Luminița Maria SCUTARU

Head of Department

Ph.D.eng. Sever-Alexandru HABA

Holder of seminar/ laboratory/ project

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

[3] Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

[4] Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

[5] One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Project management					
2.2 Course convenor			Assoc. prof. dr. eng. Dumitrașcu Dorin-Ion					
2.3 Seminar/ laboratory/ project convenor			Assoc. prof. dr. eng. Dumitrașcu Dorin-Ion					
2.4 Study year	II	2.5 Semester	I	2.6 Evaluation type	E	2.7 Course status	Content[3)]	SC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**2**	out of which: 3.2 lecture	**1**	3.3 seminar/ laboratory/ project	**0/0/1**
3.4 Total number of hours in the curriculum	28	out of which: 3.5 lecture	14	3.6 seminar/ laboratory/ project	0/0/14

Time allocation	hours
Study of textbooks, course support, bibliography and notes	28
Additional documentation in libraries, specialized electronic platforms, and field research	22
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	16
Tutorial	4
Examinations	2
Other activities.....	

3.7 Total number of hours of student activity	72
3.8 Total number per semester	**100**
3.9 Number of credits[5)]	4

4. Prerequisites (if applicable)

4.1 curriculum-related	•
4.2 competences-related	•

5. Conditions (if applicable)

5.1 for course development	•
5.2 for seminar/ laboratory/ project development	•

6. Specific competences

Professional competences	C1. Coordination of the quality management system and project management L.O.3.1. The graduate can plan, coordinate and direct all production activities in order to ensure product quality; L.O.3.2. The graduate can carry out activities related to quality control by carrying out inspections and tests of services, processes or products; L.O.3.3. The graduate can manage and plan various resources required for a specific project and monitor the progress recorded within the project to achieve a specific objective within a certain period of time and with a predetermined budget; L.O.3.4. The graduate can carry out cost and financial benefit analyses for a project over a certain period of time.
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. L.O.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the conception, calculation and design activity of a propulsion system/mechanical system. CT2. Autonomy and critical thinking L.O.2.1 The graduate develops his own way of solving a task, working motivatedly, with little or no supervision. L.O.2.2 The graduate has autonomy in making technical decisions or those related to the management of design activities L.O.2.3 The graduate has the ability to ensure the quality of a mechanical structure and product/mechanical system. L.O.2.4 The graduate can develop efficient and responsible work strategies, applying the principles, norms and values of the code of professional ethics. L.O.2.6 The graduate has the ability to objectively self-assess the need for lifelong learning, use information and communication in an internationally spoken language for the purpose of insertion in the labor market and continuous adaptation to its requirements. CT3. Preparation and presentation of reports describing the results and processes of scientific or technical research. L.O.3.1 The graduate can write and present technical reports for semester practice and/or for discipline projects, going through all the necessary stages, from documentation, idea/concept, modeling/simulation to testing/validation. L.O.3.2 The graduate understands and ensures compliance with the norms of ethics and academic integrity in writing reports. L.O.3.3 The graduate works independently for the purpose of scientific information and to obtain the data necessary to solve the project topics; identifies his own sources of documentation. L.O.3.4 The graduate has the capacity for interpersonal communication, professional counseling and assuming leadership roles in the work team.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• acquiring both, the basic aspects regarding the environment of industrial and research projects, as well as the theoretical and practical aspects of project management, the main areas of project management.
7.2 Specific objectives	• identifying and using the specific elements for the elaboration, implementation and monitoring of an industrial and research project;

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
1. The project – general aspects, types of projects	Projector, debates	2	
2. Project development main elements		2	
3. Phases and processes involved in the projects		2	
4. Project management – general aspects		2	
5. The project management knowledge areas		6	
Bibliography 1. Dumitraşcu, D., Şimon, A-E., Caia, G., Merfea, B. – Managementul proiectelor. Editura Universității "Transilvania", Brașov 2005. 2. A guide to the project management body of knowledge (PMBOK® guide). Fifth edition. 3. Practice standard for project estimating / Project Management Institute 4. Richardson, G. – Project management theory and practice, second edition 5. Heagney, J. – Fundamentals of project management, fourth edition			
8.2 Seminar/ laboratory/ project	Teaching-learning methods	Number of hours	Remarks
1. Analysis of case studies, examples of projects	Projector, debates	2	
2. Methods of identification of a project.		2	
3. Tools and techniques to develop a project		4	
4. Implementation, monitoring and reporting a project		4	
5. Project evaluation		2	
Bibliography 1. Dumitraşcu, D., Şimon, A-E., Caia, G., Merfea, B. – Managementul proiectelor. Editura Universității "Transilvania", Brașov 2005. 2. A guide to the project management body of knowledge (PMBOK® guide). Fifth edition. 3. Practice standard for project estimating / Project Management Institute 4. Richardson, G. – Project management theory and practice, second edition 5. Heagney, J. – Fundamentals of project management, fourth edition			

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

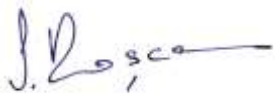
The content of the discipline, the competences developed by participating in this course are in accordance with the specific requirements needed to identify, elaborate, implement and coordinate projects in the economic environment.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Theoretical knowledge	Exam	60%
	Practical analysis		
10.5 Project	Develop a project	Project presentation	40%
10.6 Minimal performance standard			
• The marks obtained for project activities and exam should be minimum equal to 5.			

This course outline was certified in the Department Board meeting on 27.09.2024 and approved in the Faculty Board meeting on 30.09.2024

Prof. dr. ing. Ioan Călin ROȘCA,



Dean

Prof. dr. ing. Maria Luminița SCUTARU

Head of Department

Conf. dr. ing. Dorin Ion DUMITRAȘCU,

Course holder

Conf. dr. ing. Dorin Ion DUMITRAȘCU,

Holder of project

Note:

1) Field of study – select one of the following options: BA/MA/PhD. (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: BA/MA/PhD;

3) Course status (content) – for the BA level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the MA level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

5) One credit is the equivalent of 25 – 30 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	Master
1.6 Study programme/ Qualification	Practical Integrated Methods for Propulsion Systems Engineering

2. Data about the course

2.1 Name of course			FEM simulation in mechanical engineering					
2.2 Course convenor			Assoc. prof. dr. ing. Marius Nicolae Baba					
2.3 Project convenor			Assoc. prof. dr. ing. Marius Nicolae Baba					
2.4 Study year	II	2.5 Semester	I	2.6 Evaluation type	E	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**4**	out of which: 3.2 lecture	**2**	3.3 project	**2**
3.4 Total number of hours in the curriculum	**56**	out of which: 3.5 lecture	**28**	3.6 project	**28**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	26
Additional documentation in libraries, specialized electronic platforms, and field research	10
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	20
Tutorial	12
Examinations	1
Other activities.....	-

3.7 Total number of hours of student activity	69
3.8 Total number per semester	**125**
3.9 Number of credits[5)]	5

4. Prerequisites (if applicable)

4.1 curriculum-related	• The course in Theory of elasticity • The course in Machine elements
4.2 competences-related	• The course in Mechanics of materials (1st year, 1st semester) • The course in Computer-aided numerical control (1st year, 2nd semester)

5. Conditions (if applicable)

5.1 for course development	• Classroom with blackboard and video projector.
5.2 for seminar/ laboratory/ project development	• Laboratory equipped with computers and dedicated software for simulation, modeling and analysis with finite elements (Simcenter 3D, Hymermesh, Abaqus CAE, FE-safe, Matlab).

6. Specific competences and learning outcomes

Professional competences	Cp2. Ability to apply simulation and testing methods for propulsion systems and use specialized programs for design (CAD/CAE): L.O.2.1. The graduate can simulate the behavior of propulsive system models based on specialized software; L.O.2.4. The graduate can use computer-aided engineering software to design propulsion systems (dedicated software for CAE). Cp3. Coordination of the quality management system and project management: L.O.3.3. The graduate can manage and plan various resources necessary for a specific project and monitor the progress recorded within the project to achieve a specific objective within a certain period and with a predetermined budget.
Transversal competences	Ct1. Definition and/or use of concepts, theories, and scientific methods in the field of mechanical engineering: L.O.1.2 The graduate can apply the theoretical and practical knowledge, methods, and terminology acquired in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the activity of conception, calculation, and design of a propulsion system/mechanical system. Ct2. Autonomy and critical thinking: L.O.2.1 The graduate develops his own way of solving a task, working motivatedly with little or no supervision. L.O.2.3 The graduate has the ability to ensure the quality of a mechanical structure and product/mechanical system. L.O.2.6 The graduate has the ability to objectively self-assess the need for lifelong learning, the use of information and communication in an internationally spoken language for insertion in the labor market, and continuous adaptation to its requirements. Ct3. Preparing and presenting reports describing scientific or technical research results and processes: L.O.3.1 The graduate can write and present technical reports for semester practice and/or discipline projects, going through all the necessary stages, from documentation, idea/concept, modeling/simulation, to testing/validation. L.O.3.3 The graduate works independently for the purpose of scientific information and to obtain the data necessary to solve project tasks and identify his/her own sources of documentation.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• Developing skills in understanding and formulating the main modern means of theoretical and practical approach to finite element analysis studies as essential components of the design process in mechanical engineering.
7.2 Specific objectives	• Assimilation of specific notions for the approach to calculations of strength, stiffness, stability, fracture mechanics, fatigue, and heat transfer phenomena using the finite element method for static or dynamic analysis studies. • Assimilation of theoretical and practical knowledge regarding the analysis of stress states, strains, displacements, speeds, or accelerations commonly encountered in the design of mechanical systems.

8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
Fundamental concepts and principles of the finite element method with applications in mechanical engineering, Advantages, disadvantages and limitations of the finite element method, Sources of errors in finite element modeling.	Blackboard presentation and interactive discussions	4	-

General elements of elasticity theory.	Blackboard presentation and interactive discussions	3	-
Fundamental aspects of modeling and analysis of structures with geometric and/or material nonlinearities.		3	-
Basic aspects of modeling and analysis of contact problems.		3	-
Modeling and analysis of structures for stability under critical and post-critical loading.		3	-
Finite element modeling for solving fracture mechanics problems under static loads.		3	-
Modeling and calculation with finite elements under variable loads – mechanical fatigue.		3	-
Peculiarities of finite element analysis in the case of modeling and simulation of heat propagation and transmission phenomena.		3	-
Aspects of applying finite element analysis for modeling and simulation of dynamic problems.		3	-

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2. Radeș, M. Analiza cu elemente finite. Bucureşti, Universitatea Politehnica din Bucureşti, 2019.
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10. Cook, R,D., et al. Concepts and applications of finite element analysis. John Wiley & sons, 2007.

8.2 Project	Teaching-learning methods	Number of hours	Remarks
Simulation of the structural behavior of a 3D frame: static analysis with large specific displacements and strains (geometric nonlinearity): Abaqus CAE software.	Solving practical applications, processing data, preparing reports of results, and critically analysis of results	2	-
Modeling the structural behavior of a 3D support-bracket part: static analysis with physical (material) nonlinearity: Abaqus CAE software.		3	-
Structural simulation of a 3D pump assembly: static analysis with general nonlinearity. (which cumulates the conditions of material nonlinearity and geometric nonlinearity): Abaqus CAE software. CAE.		3	-
Nonlinear static analysis of stability (buckling) in the critical and post-critical regime of cylindrical shells subjected to torsion, using the arc-length algorithm: Abaqus CAE software.		3	-

Simulation of crack propagation under static loading of a CT-type specimen made of steel, with a pre-existing crack using the XFEM methodology: Abaqus CAE software.	Solving practical applications, processing data, preparing reports of results, and critically analysis of results	3	-
Simulation of variable loading (uniaxial fatigue) of a shock absorber type part within the low durability range (LCF) using the direct-cycle method: Abaqus CAE software.		2	-
Modeling the response to variable loads (multiaxial fatigue) of a shaft-type part loaded in the high durability range (HCF): Abaqus CAE and FE-safe software.		3	-
Introduction to multidisciplinary finite element modeling. Coupling of analyses (thermal and mechanical effects) for the case of a pressure vessel: Abaqus CAE software.		3	-
Harmonic analysis (frequency response) for an anchor part: Abaqus CAE software.		3	-
Explicit dynamic analysis of a rectangular metal plate subjected to transverse ballistic impact with a spherical projectile: Abaqus CAE software.		3	-

Bibliography

1. Baba, M, N., Grovu, M., Păuna, C., Runcianu, C. Proiectarea pe baza duratei de viață – Îndrumar de laborator, Reprografia Universității Transilvania din Brașov, 2020.
2. Khennane, A. Introduction to finite element analysis using MATLAB® and Abaqus. CRC Press, 2013.
3. Cerbu, C, and Popa, A.C.V. Modelarea structurilor mecanice: aplicații în Abaqus. Editura Universității Transilvania, 2013.
4. Giner, E., Sukumar, N., Tarancón, J. E., & Fuenmayor, F. J. An Abaqus implementation of the extended finite element method. Engineering fracture mechanics, 2009.
5. Shigley, J. E., Mischke, C. R., and Budynas, R,G. Mechanical Engineering Design, 2004, Seventh Edition, McGraw Hill, New York, NY.
6. Roşca, I.C. Vibrații mecanice. Infomarket, 2002.
7. Pană, T., Pastramă, St.D. Integritatea structurilor metalice, Editura Fair Partners, Bucuresti, 2000.

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

The skills acquired will be necessary for design engineers in mechanical engineering, industrial engineering, and automotive engineering who work in design companies, as well as for technological engineers.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Six short-answer questions to test the knowledge of fundamental terms and concepts	Written exam (1 hour)	50%
10.5 Seminar/ laboratory/ project	Submitting results reports for projects developed during the semester on time	Project milestones, deadlines, and achievement of objectives set within the project themes.	50%
10.6 Minimal performance standard			
• For the written theory exam, the minimum passing grade is 5 (five): The student must demonstrate the ability to exemplify and justify the answers to the theoretical questions graphically.			

- The minimum passing grade for the project is 5 (five): The condition for passing is that each project topic must be scored with a minimum of 5 (five). The student must demonstrate the ability to solve each project topic based on the basic theoretical principles presented in the course and discussed when granting visas.
- The final grade consists of 0.5 (Written theory exam) + 0.5 (Project).

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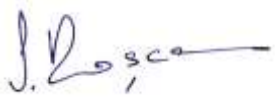
Prof.dr.ing. Ioan Călin, ROȘCA



Dean

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Assoc. prof. dr. eng. Marius N. Baba,

Course holder

Assoc. prof. dr. eng. Marius N. Baba

Holder of project

Note:

1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: Bachelor / Master / Doctorat;

3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ SC (synthesis course)/ **AC** (advanced course);

4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Professional internship					
2.2 Course convenor								
2.3 ~~Seminar~~/ ~~laboratory~~/ project convenor								
2.4 Study year	II	2.5 Semester	I	2.6 Evaluation type	C	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**12**	out of which: 3.2 lecture		3.3 Project	**12**
3.4 Total number of hours in the curriculum	**168**	out of which: 3.5 lecture		3.6. Project	**168**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	20
Additional documentation in libraries, specialized electronic platforms, and field research	40
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	60
Tutorial	28
Examinations	2
Other activities.....	20

3.7 Total number of individual learning hours	-
3.8 Total number per semester	-
3.9 Number of credits[4)]	**6**

4. Prerequisites (if applicable)

4.1 curriculum-related	
4.2 competences-related	• To be able to do projects

5. Conditions (if applicable)

5.1 for course development	
5.2 for seminar/ laboratory/ project development	• In the University laboratories and in the frame of Schaeffler Romania Company.

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems L.O.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; L.O.1.2. The graduate can analyze the principles that must be used in the development of technical projects L.O.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. L.O.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the activity of conception, calculation and design of a propulsion system/mechanical system.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• To do a project / semester that demonstrate engineering skills acquired during the second year semesters
7.2 Specific objectives	• Improving knowledge acquired in the two semesters of the second year of study • Defining a theme to be continued at master's thesis

8. Content

8.1 Project	Teaching methods	Remarks
Identify issues for project practice	Individual or team work	
Establishing project design practice		
Identification of development directions of the theme		
Analysis of the actual situation		
Determination of the solutions encountered problems		
Presentation of projects		

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers)

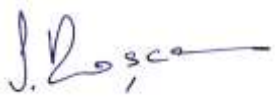
The topic is made with the company Schaeffler Romania is centered on a theme of its own

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course			
10.5 Project	Scientific level of the project	Oral presentation	100%
10.6 Minimal performance standard			
• Students must prove, by design, the properties of terms and technical foundations.			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024

Prof.dr.ing. Ioan Călin, ROȘCA



Dean

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Course holder	**Holder of project**
Not the case	**Individual holder**

Note:

[1] Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

[2] Study level – choose from among: Bachelor / Master / Doctorat;

[3] Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ **SC** (synthesis course)/ **AC** (advanced course);

[4] Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);

[5] One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Professional Intership					
2.2 Course convenor								
2.3 Seminar/ laboratory/ project convenor								
2.4 Study year	II	2.5 Semester	2	2.6 Evaluation type	C	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**22**	out of which: 3.2 lecture	**0**	3.3 Project	**22**
3.4 Total number of hours in the curriculum	**308**	out of which: 3.5 lecture	**0**	3.6. Project	**308**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	75
Additional documentation in libraries, specialized electronic platforms, and field research	60
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	85
Tutorial	48
Examinations	2
Other activities.....	38

3.7 Total number of individual learning hours	
3.8 Total number per semester	
3.9 Number of credits[4)]	**20**

4. Prerequisites (if applicable)

4.1 curriculum-related	
4.2 competences-related	• To be able to do projects

5. Conditions (if applicable)

5.1 for course development	
5.2 for seminar/ laboratory/ project development	• In the University laboratories and in the frame of Schaeffler Romania Company.

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems L.O.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; L.O.1.2. The graduate can analyze the principles that must be used in the development of technical projects L.O.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems;
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. L.O.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the activity of conception, calculation and design of a propulsion system/mechanical system.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• To do a project / semester that demonstrate engineering skills acquired during the second year semesters
7.2 Specific objectives	• Improving knowledge acquired in the two semesters of the second year of study • Defining a theme to be continued at master's thesis

8. Content

8.1 Project	Teaching methods	Remarks
Identify issues for project practice	Individual or team work	
Establishing project design practice		
Identification of development directions of the theme		
Analysis of the actual situation		
Determination of the solutions encountered problems		
Presentation of projects		

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers)

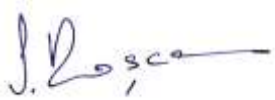
The topic is made with the company Schaeffler Romania is centered on a theme of its own

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course			
10.5 Project	Scientific level of the project	Oral presentation	100%
10.6 Minimal performance standard			
• Students must prove, by design, the properties of terms and technical foundations.			

This course outline was certified in the Department Board meeting on 27/09/2024 and approved in the Faculty Board meeting on 30/09/2024

Prof.dr.ing. Ioan Călin, ROȘCA



Dean

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Not the case	**Individual holder**
Course holder	**Project holder**

[1] Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);

[2] Study level – choose from among: Bachelor / Master / Doctorat;

[3] Course status (content) – for the Bachelor level, select one of the following options: FC (fundamental course) / DC (course in the study domain)/ SC (speciality course)/ CC (complementary course); for the Master level, select one of the following options: PC (proficiency course)/ SC (synthesis course)/ AC (advanced course);

[4] Course status (attendance type) – select one of the following options: CPC (compulsory course)/ EC (elective course)/ NCPC (non-compulsory course);

[5] One credit is the equivalent of 25 study hours (teaching activities and individual study).

COURSE OUTLINE

1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brașov
1.2 Faculty	Mechanical Engineering
1.3 Department	Mechanical Engineering
1.4 Field of study[1)]	Mechanical Engineering
1.5 Study level[2)]	MASTER
1.6 Study programme/ Qualification	Practical Integrated Methods for engines engineering

2. Data about the course

2.1 Name of course			Disertation project activity					
2.2 Course convenor								
2.3 Seminar/ laboratory/ project convenor								
2.4 Study year	II	2.5 Semester	2	2.6 Evaluation type	C	2.7 Course status	Content[3)]	PC
							Attendance type[4)]	CPC

3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	**6**	out of which: 3.2 lecture	**0**	3.3 Project	**6**
3.4 Total number of hours in the curriculum	**84**	out of which: 3.5 lecture	**0**	3.6. Project	**84**

Time allocation	hours
Study of textbooks, course support, bibliography and notes	15
Additional documentation in libraries, specialized electronic platforms, and field research	25
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays	18
Tutorial	14
Examinations	1
Other activities.....	11

3.7 Total number of individual learning hours	
3.8 Total number per semester	
3.9 Number of credits[4)]	**10**

4. Prerequisites (if applicable)

4.1 curriculum-related	• Complete all disciplines along the four years of southern
4.2 competences-related	• To be able to do projects

5. Conditions (if applicable)

5.1 for course development	
5.2 for seminar/ laboratory/ project development	• In the University laboratories and in the frame of Schaeffler Romania Company.

6. Specific competences

Professional competences	C1. Ability to develop products and define criteria for selecting design solutions for propulsion systems L.O.1.1. The graduate can conceive sketches and design elements necessary to develop and communicate design concepts; L.O.1.2. The graduate can analyze the principles that must be used in the development of technical projects; L.O.1.3. The graduate can use the technical documentation in the technical process, in general and, in particular, for the realization of propulsion systems; C2. The ability to apply simulation and testing methods for propulsion systems and to use specialized programs for design (CAD/CAE) L.O.2.1. The graduate can perform the simulation of the behavior of the models of propulsion systems based on specialized software; L.O.2.2. The graduate can develop test protocols and interpret and analyze data collected during testing to formulate conclusions and solutions; L.O.2.3. The graduate can develop, design and make prototypes for the evaluation of propulsion equipment tests; L.O.2.4. The graduate can use assisted engineering software specific to the design of propulsion systems (dedicated software for CAE). L.O.2.5. The graduate can use computer-aided design systems (dedicated CAD software); C3. Coordination of the quality management system and project management L.O.3.1. The graduate can plan, coordinate and direct all production activities in order to ensure the quality of the products; L.O.3.2. The graduate can carry out activities related to quality control by performing inspections and tests of services, processes or products; L.O.3.3. The graduate can manage and plan various resources required for a specific project and monitor the progress of the project to achieve a specific objective within a specific period of time and with a predetermined budget; L.O.3.4. The graduate can perform cost and financial benefit analysis for a project over a period of time.
Transversal competences	CT1. Definition and/or use of concepts, theories and scientific methods in the field of mechanical engineering L.O.1.1 The graduate can adequately use specialized information in professional communication. L.O.1.2 The graduate can apply the acquired theoretical and practical knowledge, methods and terminology in the field of mechanical engineering. L.O.1.3 The graduate has the ability to coordinate the activity of conception, calculation and design of a propulsion system/mechanical system. CT3. Preparing and presenting reports describing the results and processes of scientific or technical research. L.O.3.1 The graduate can write and present technical reports for the semester practice and/or for the discipline projects, going through all the necessary stages, from documentation, idea/concept, modeling/simulation to testing/validation. L.O.3.3 The graduate works independently for the purpose of scientific information and to obtain the data necessary to solve the project topics; identify own sources of documentation.

7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	• a project demonstrating the engineering capacities acquired during the two years of study
7.2 Specific objectives	Establishment of the project structure 1. Table of Contents 2. Introduction (Scientific importance, applicability, realization) 3. Current status and trends in the field of proposed theme 4. Modeling and simulation of the proposed solution 5. Testing the Model

	6. Design of component parts 7. Economic Analysis 8. Conclusions 9. Bibliography It is recommended to: • Achievement of the draft Diploma in partnership with Schaeffler Romania Company; • Lucrarea, redactată pe hârtie A4, va cuprinde minimum 75 de pagini și maxim 90 pagini; • The support will be made with video support (projector) being developed in Power Point and on drawings with technical drawing of execution; • The work will be done before a Commission with the consent of the scientific coordinator.

8. Content

8.1 Project	Teaching methods	Remarks
Identify issues for project practice	Individual or team work	2 hours
Reviewing the theoretical foundations required for the project theme		1 hour
Establishing the table of contents and bibliography		1 hour
Analysis of the current stage and trends in the field of the Diploma project (scientific importance, applicability, realization)		20 hours
Identification of the theme development directorates in the dissertation project		4 hours
Theoretical substantiation of the basis of diploma		28 hours
Experimental substantiation of the basis of diploma		28 hours

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers)

• Students must acquire the basics of the technique

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course			
10.5 Project	Scientific level of the project	Oral presentation	100%
10.6 Minimal performance standard			
• Students must prove, by design, the properties of terms and technical foundations.			

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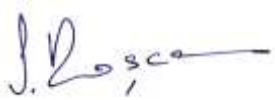
Prof.dr.ing. Ioan Călin, ROȘCA



Dean

Prof.dr.ing. Maria Luminița, SCUTARU

Head of Department

Not the case **Individual holder**

Course holder **Project holder**

Note:

1) Field of study – select one of the following options: BA/MA/PhD. (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: BA/MA/PhD;

3) Course status (content) – for the BA level, select one of the following options: FC (fundamental course) / DC (course in the study domain)/ SC (speciality course)/ CC (complementary course); for the MA level, select one of the following options: PC (proficiency course)/ SC (synthesis course)/ AC (advanced course);

4) Course status (attendance type) – select one of the following options: CPC (compulsory course)/ EC (elective course)/ NCPC (non-compulsory course);

5) One credit is the equivalent of 25 study hours (teaching activities and individual study).