

[GMX204] MECHANICAL ENGINEERING LABORATORY I

GENERAL INFORMATION

Studies	DEGREE IN MECHANICAL ENGINEERING		Subject	MECHANICAL PROJECTS
Semester	2	Course	2	Mention / Field of specialisation
Character	OPTIONAL		Language	CASTELLANO
Plan	2017	Modality	Face-to-face	Total hours
Credits	3	Hours/week	1.58	28.5 class hours + 46.5 non-class hours = 75 total hours

PROFESSORS

FERNANDEZ MANCHADO, RAUL
IRAGUI SAN PEDRO, MIKEL
ITURRICHIA PEREZ DE ALBENIZ, ALFREDO
LARRAÑAGA SERNA, MIREN
DOKBE-SELA BARRIAL, ANDRES
ALONSO DE MEZQUIA GONZALEZ, DAVID
ALCORTA ANDOAGA, ILLART

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
STATISTICS	[!]
GRAPHIC EXPRESSION II	
MANUFACTURING TECHNOLOGIES	
MECHANICS	

SKILLS

VERIFICA SKILLS

SPECIFIC

- GMCI01** - To have knowledge of applied thermodynamics and heat transfer. To understand the fundamental principles and apply them to problem solving in engineering
- GMCI02** - To understand the fundamental principles of fluid mechanics and their application to problem solving in the field of engineering. To be able to calculate fluid systems, pipes and channels.
- GMCI03** - To know the fundamentals of science, technology and chemistry of materials. To understand the relationship between the microstructure, the synthesis and the properties of materials.
- GMCI04** - To know and use the principles of circuit theory and electrical machines
- GMCI07** - To know the principles of mechanisms and machine theory.
- GMCI08** - To have knowledge of the principles of the resistance of materials and be able to apply them.
- GMCI09** - To know the fundamentals of manufacturing and production systems.
- GMCI11** - Applied knowledge of company organisation.

GENERAL

- GMCT03** - To build on basic concepts and technologies to expand knowledge of new theories and methods, and to acquire flexibility to adapt to new situations
- GMCT04** - To be able to take the initiative in problem solving, decision making, creativity, critical thinking, effective communication and the transfer of knowledge and skills in the field of mechanical engineering.
- GMCT05** - Possessing the knowledge for performing measurements, calculations, valuations, estimates, inspections, studies, reports, work plans and other similar tasks.

BASIC

- G_CB1** - To have proven to understand and have knowledge in a field of study based on general secondary education at a level found in advanced textbooks and including concepts at the forefront of their field of study.
- G_CB2** - To be able to apply knowledge to occupational or professional tasks; have the necessary skills to pose and defend arguments, and to solve problems within their field of study
- G_CB4** - To be able to communicate information, ideas, problems and solutions to both expert and lay audiences

ENAAE LEARNING RESULTS

	ECTS
ENA103 - Knowledge and comprehension: Awareness of the multidisciplinary context of engineering.	2,76
ENA110 - Research and innovation: Capacity and ability to project and carry out experimental investigations, interpret results, and reach conclusions in their field of study.	0,04
ENA111 - Practical application of engineering: Understanding of the applicable techniques and methods for analysis, design and research and their limitations in the field of their speciality.	0,04
ENA113 - Practical application of engineering: Knowledge of application of materials, equipment and tools, engineering technology and processes, and their limitations in the field of their speciality.	0,04
ENA114 - Practical application of engineering: Ability to apply standards of engineering practice in their speciality.	0,04
ENA119 - Communication and Teamwork: Ability to effectively communicate information, ideas, problems and solutions in the field of engineering and with society in general.	0,04

ENA120 - Communication and Teamwork: Ability to operate effectively in domestic and international contexts, individually and as a team, and to cooperate with both engineers and people from other disciplines.

0,04

Total: 3

LEARNING RESULTS

RG203 They apply methods, techniques, regulations, etc. typical of the engineering profession in familiar contexts.

LEARNING ACTIVITIES		CH	NCH	TH
Individual and team exercises			13 h.	13 h.
Individual or team workshop and/or lab practice		7 h.		7 h.
Individual and/or team computer simulation practice		5 h.		5 h.
EVALUATION SYSTEM		W	MAKE-UP MECHANISMS	
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices		30%	(No mechanisms)	
Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence		40%		
Observation of student participation and attitude in the proposed training activities		30%		

CH - Class hours: 12 h.
NCH - Non-class hours: 13 h.
TH - Total hours: 25 h.

RG202 They make decisions and evaluate any possible consequences of the selected alternative.

LEARNING ACTIVITIES		CH	NCH	TH
Individual and team exercises			6,5 h.	6,5 h.
Individual or team workshop and/or lab practice		3 h.		3 h.
Individual and/or team computer simulation practice		3 h.		3 h.
EVALUATION SYSTEM		W	MAKE-UP MECHANISMS	
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices		30%	(No mechanisms)	
Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence		40%		
Observation of student participation and attitude in the proposed training activities		30%		

CH - Class hours: 6 h.
NCH - Non-class hours: 6,5 h.
TH - Total hours: 12,5 h.

RG204 Define the problem, develop the solution and present the conclusions in a efficient manner, arguing and justifying each one of them in writing.

LEARNING ACTIVITIES		CH	NCH	TH
Development, writing and presentation of memorandums, reports, audiovisual material, etc.		2 h.	10,5 h.	12,5 h.
Relating to projects/POPBLs carried out individually or in teams				
EVALUATION SYSTEM		W	MAKE-UP MECHANISMS	
Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence		80%	(No mechanisms)	
Observation of student participation and attitude in the proposed training activities		20%		

CH - Class hours: 2 h.
NCH - Non-class hours: 10,5 h.
TH - Total hours: 12,5 h.

RG205 Define the problem, develop the solution and present the conclusions in a efficient manner, arguing and justifying each one of them in spoken form.

LEARNING ACTIVITIES		CH	NCH	TH
Development, writing and presentation of memorandums, reports, audiovisual material, etc.		2 h.	10,5 h.	12,5 h.
Relating to projects/POPBLs carried out individually or in teams				
EVALUATION SYSTEM		W	MAKE-UP MECHANISMS	
Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence		80%	(No mechanisms)	
Observation of student participation and attitude in the proposed training activities		20%		

CH - Class hours: 2 h.
NCH - Non-class hours: 10,5 h.
TH - Total hours: 12,5 h.

RG201 They coordinate the work with the rest of the group members, contributing to develop the task to be done and creating a good work atmosphere.

LEARNING ACTIVITIES		CH	NCH	TH
Individual and team exercises			6 h.	6 h.
Individual or team workshop and/or lab practice		3,5 h.		3,5 h.
Individual and/or team computer simulation practice		3 h.		3 h.
EVALUATION SYSTEM		W	MAKE-UP MECHANISMS	
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices		30%	(No mechanisms)	
Technical skills, involvement in the project, finished work, obtained results, handed documentation, presentation and technical defence		40%		
Observation of student participation and attitude in the proposed training activities		30%		

CH - Class hours: 6,5 h.
NCH - Non-class hours: 6 h.
TH - Total hours: 12,5 h.

CONTENTS

1. Mechanical assembly
 1. Assembly process
 2. Tolerances: dimensional, geometric and surface
2. Stress concentration analysis
 1. Analytical calculation
 2. Numerical calculation: SOLIDWORKS SIMULATION
 3. Experimental determination
3. Thermal Machines
 1. Analysis of OTTO's cycle using MATLAB
 2. Experimental analysis of a gasoline engine
4. Three phase system
 1. Analysis of the connections and parameters of a three-phase system
 2. Direct start of a three-phase motor
5. Tool geometry for chip removal processes
 1. Turning tools
 2. Drilling tools
6. Lean production

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1. Plant distribution
 2. Production cycle time and takt time
 3. Cell and manufacturing lines balancing

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Moodle Platform
Labs

Bibliography

(No bibliography)