



Polytechnic Institute of Viseu

Higher School of Technology and Management of Viseu

International Semesters for students

Mechanical Engineering Spring Semester

Semester Title	Mechanical Engineering	Semester	Spring
Person responsible	António Martins	E-mail adress	amartins@estv.ipv.pt
Person responsible	Susana Ferreira	E-mail adress	susana@estv.ipv.pt
Language of instruction	English	ECTS points	30
Course type	Course title	Name of the lecturer	ECTS points
Optional	Materials Science and Engineering	Serafim Oliveira	6
Optional	Mechanics	João Vinhas	6
Optional	Industrial Maintenance Management and Quality Control	Daniel Gaspar	6
Optional	Heat and Mass Transfer	João Monney Paiva	6
Optional	Fluid Mechanics	Alexandre Aibéo	6
Optional	Mechanical Technology	Cristina Romão Adelino Trindade	6

Course title	Materials Science and Engineering		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Serafim Oliveira	E-mail address:	soliveira@estv.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	Optional
Hours per week	5	Hours per semester	65
Objectives of the course	Study of crystalline structures; Characterization and application of engineering metallic alloys; Introduction to Catalogues and standards; Ability to make a decision, to perform, to evaluate results and to suggest new approaches in order to improve the mechanical properties of machinery components. To be advertised with chemical compounds.		
Entry requirements	None.		
Course contents	MODULE 1 – THE STRUCTURE OF CRYSTALLINE SOLIDS MODULE 2 – METALS SOLIDIFICATION AND DEFORMATION MODULE 3 – MECHANICAL PROPERTIES AND MECHANICAL ASSAYS MODULE 4 – HEAT TREATMENT OF METALLIC ALLOYS MODULE 5 – THERMOCHEMICAL TREATMENTS MODULE 6 – NON FERROUS ALLOYS		
Assessment methods	The evaluation will consist of a final written test and continuous assessment. There shall be a minimum value of attendance, representing 75% of classes.		
Recommended readings	Callister, W. D.; “Materials Science and Engineering an Introduction”; 7ª ed. John Wiley, 2007. Smith, W. S., Princípios de Ciência e Engenharia dos Materiais, 3ª ed., McGrawHill, 1996. Propriedades e Normalização”; Fundação Calouste Gulbenkian. Soares, Pinto; “Aços-Características Tratamentos”. Chiaverini, Vicente; “Tecnologia Mecânica”, Volumes I, II e III; McGraw Hill. Rocha, Acácio Teixeira; “Tecnologia Mecânica”, Volumes II; Coimbra Editora. Seabra, Antera Valeriana de; “Metalurgia Geral”, Volumes I, II e III; LNEC. Branco, C. Moura; “Mecânica dos Materiais” ; Fundação Calouste Gulbenkian. Miranda, R. M. e Lopes, E. M. Dias; “Metalurgia da Soldadura”. Cottrell, A.; “Introdução à Metalurgia”. “Metals Handbook” – Second Edition; 1998. Tabela Técnica de Aços - F.Ramada. Tabela Técnica de Aços – Afir. Normas Técnicas.		
Additional information			

Course title	Mechanics		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	João Vinhas	E-mail address:	jvinhas@estv.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	Optional
Hours per week	5	Hours per semester	65
Objectives of the course	Generally speaking, students who attend successfully this curricular unit should be empowered with the knowledge of classical mechanics that enable them to understand and analyze the behavior of matter and bodies as structural elements, subject to static and dynamic loads.		
Entry requirements	Kinematics and dynamics of a particle.		
Course contents	<p>I-KINEMATICS AND DYNAMICS OF ROTATION Rotation of a rigid body. Kinematics and dynamics of rotation.</p> <p>II- FORCES Vector nature and classification of forces (distributed forces, concentrated active and reactive forces).</p> <p>III-EQUILIBRIUM OF A PARTICLE Equilibrium of a particle in plane and space.</p> <p>IV-EQUILIBRIUM OF A RIGID BODY Equilibrium of a rigid body in plane and space.</p>		
Assessment methods	The overall evaluation will be based on written tests, oral discussions, laboratory practice component and continuous evaluation concerning the quality of participation.		
Recommended readings	<p>- Beer, F.; Johnston, E.: Vector Mechanics for Engineers- Statics. McGraw-Hill</p> <p>- Beer, F.; Johnston, E.: Vector Mechanics for Engineers- Dynamics. McGraw-Hill</p>		
Additional information			

Course title	Industrial Maintenance Management and Quality Control		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Daniel Gaspar	E-mail address:	danigaspar@estv.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	Optional
Hours per week	5	Hours per semester	65
Objectives of the course	Students who attend successfully this curricular unit will develop skills in maintenance management, understanding different techniques of maintenance, how to planning and schedule maintenance; apply the principles of quality management and the techniques of statistical control of processes.		
Entry requirements	Basis of statistics		
Course contents	MODULE 1 - INTRODUCTION TO INDUSTRIAL MAINTENANCE MODULE 2 - TYPES OF INDUSTRIAL MAINTENANCE MODULE 3 - INTRODUCTION TO TPM MODULE 4 - INTRODUCTION TO APPLIED STATISTICS MODULE 5 - KNOWLEDGE AND BEHAVIOUR OF MATERIAL MODULE 6 - ANALYSIS OF COST OF MAINTENANCE MODULE 7 - INTRODUCTION TO QUALITY MODULE 8 - STATISTICAL PROCESS CONTROL MODULE 9 - RESEARCH AND QUALITY PLANNING		
Assessment methods	The overall evaluation will be based on written tests, practical works and still based on continuous evaluation concerning the quality of participation.		
Recommended readings	Monchy F; <i>"Maintenance Méthodes et organisations"</i> , Editora Dunod. Ebleling Charles E; <i>"An Introduction to Reliability and Maintainability Engineering"</i> . Juran J. M; , <i>Juran'S Quality Handbook</i> , MCGRAW-HILL EDUCATION. Richard B. C., Nicholas J. A., <i>Operations management for competitive advantage</i> , McGraw-Hill Irwin.		
Additional information			

Course title	Heat and Mass Transfer		
Teaching method	Classes (theoretical and practical) and labs.		
Person responsible for the course	João Monney Paiva	E-mail address:	jmonney@estv.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	Optional
Hours per week	5	Hours per semester	65
Objectives of the course	Underlining heat transfer phenomena importance in common daily life and engineering practice. Establishing fundamental equations, setting boundary conditions and defining simplifying assumptions suitable for typical problems of conduction, convection, radiation and mass transfer. Describing methods of solving these problems, using practical examples from engineering, through rigorous or approximated methods.		
Entry requirements	None.		
Course contents	Conduction, convection, radiation and mass transfer.		
Assessment methods	Formal proofs of assessment: exam. Realization of practical work throughout the semester. Participation in theoretical and practical lectures.		
Recommended readings	HEAT TRANSFER, A PRACTICAL APPROACH (SI units), Çengel, Yunus. A., McGraw-Hill Book Company, International Edition, ISBN 0-07-115223-7. FUNDAMENTALS OF HEAT AND MASS TRANSFER, 6th ed, Incropera, Frank P. e DeWitt, David P., John Wiley & Sons, ISBN 0-471-30460-3.		
Additional information	../..		

Course title	Fluid Mechanics		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Alexandre Aibéo	E-mail address:	aaibeo@estv.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	Optional
Hours per week	5	Hours per semester	65
Objectives of the course	At the end of the course, students should have the knowledge and skills to analyze different kind of systems involving fluids and to characterize laminar and turbulent flows, based on physical principles and experimental results. They should be capable of sizing pipes, reservoirs and gates, selecting pumps and to calculate drag forces on objects immersed in external flows.		
Entry requirements	Mechanics and Calculus		
Course contents	<ul style="list-style-type: none"> - Hydrostatics - Integral and differential formulation of the fundamental equations. - Dimensional analysis and similarity. - Internal Flows - External Flows. 		
Assessment methods	The evaluation is based on written tests, oral discussions, laboratory practice and reports and continuous evaluation concerning the quality of participation.		
Recommended readings	<p>Cençel, Yugus e Cimbala, John Mecânica dos fluidos, fundamentos e aplicações - Ed. McGraw-Hill Oliveira, Luis e Lopes, António Mecânica dos fluidos – Lidel, Edições Técnicas White, Frank M. Mecânica dos fluidos, 4ª ed. - Ed. McGraw-Hill White, Frank M. Fluid Mechanics, 5th ed. - Ed. McGraw-Hill Roberson, John A. e Crowe, Clayton T. Engineering Fluid Mechanics – Ed. John Wiley & Sons Streeter, Victor L. e Wylie, E. Benjamin Mecânica dos Fluidos - Ed. McGraw-Hill Young, Donald F., Munson, Bruce R. e Okiishi, Theodore H. A Brief Introduction to Fluid Mechanics - Ed. John Wiley & Sons Daugherty, R. L., Franzini, J. e Finnemore, J. Fluid Mechanics, with engineering applications - Ed. McGraw-Hill</p>		
Additional information	<p>Detailed Topics addressed in internal and external flows: internal flows versus external flows. Flow regimes. Velocity profile in turbulent flows: pipe flows. The effect of roughness in head loss. Moody diagram and Colebrook equation. Localized head losses. The use of pumps in series and parallel. Pumps selection. NPSH. Flow measurement.</p> <p>Boundary layer on a flat plate; layer thickness limit. External flows: experimental approach; drag coefficients of Two-dimensional and three-dimensional bodies</p>		

Course title	Mechanical Technology		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Cristina Romão Adelino Trindade	E-mail address:	romao@estv.ipv.pt atrind@estv.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	Optional
Hours per week	4.5	Hours per semester	58.5
Objectives of the course	The course main objective is to confer to the student a solid knowledge about metallic, ceramic and some composite materials shaping technologies and processes, as well as their positioning in the general scheme of processing technologies. Students who obtain the course will be familiarized with manufacturing techniques such as metal casting, powder metallurgy, welding, brazing and thermal cutting and empowered to select, implement and optimize the most appropriate manufacturing process for a given application.		
Entry requirements	No mandatory requirements are defined. However, knowledge about materials is advised.		
Course contents	Metal casting. Welding, Brazing and Thermal Cutting. Powder Metallurgy. Processing of ceramics.		
Assessment methods	Evaluation based on a written exam, practical work throughout the semester and participation in theoretical and practical lectures.		
Recommended readings	<p>Kalpakjian, Serope; Schmid, Steven R. - Manufacturing engineering and Technology. 5th ed. Upper Saddle River: Pearson Prentice Hall, cop. 2006. ISBN 0-13-148965-8.</p> <p>Groover, Mikell P. - Fundamentals of Modern Manufacturing: Materials, processes, and systems. 2nd ed. New York: John Wiley, 2002. ISBN 0-471-40051-3.</p> <p>Degarmo, E. Paul; Black, J. Temple; Kohser, Ronald A. - Materials and Processes in Manufacturing. 7th ed. New Jersey: Prentice Hall, cop.1988. ISBN: 0-02-328631-8.</p> <p>Ferreira, José Carvalho - Tecnologia da Pulverometalurgia. Fundação Calouste Gulbenkian, Lisboa, 2002. ISBN 972-31-0974-3.</p> <p>Ferreira, José Carvalho - Tecnologia da Fundação. Fundação Calouste Gulbenkian, Lisboa, 1999. ISBN 972-31-0837-2.</p> <p>Quintino, Luísa; Santos José - Processos de Soldadura. Edições Técnicas do ISQ. Lisboa, 1998</p> <p>Additional Teacher's Notes.</p>		
Additional information			