

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Mechanical Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	MY2701	SEMESTER	7 th
COURSE TITLE	Deformation Processes		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		WEEKLY TEACHING HOURS	CREDITS
Lectures and exercises		5	6
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialized general knowledge, skills development</i>	Specialized knowledge		
PREREQUISITE COURSES:	There are no prerequisite courses. It is recommended that students who are interested in attending the course have completed successfully the following course: Mechanical Behavior of Materials.		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (lecturing)		
COURSE WEBSITE (URL)	https://www.mie.uth.gr/?page_id=18407&lang=en		

(2) LEARNING OUTCOMES

Learning outcomes <i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i> <i>Consult Appendix A</i> <ul style="list-style-type: none"> <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> <i>Guidelines for writing Learning Outcomes</i>
<p>Upon successful completion of the course it is expected that the student is able to:</p> <ul style="list-style-type: none"> Understand basic and technological principles of bulk metal forming processes (forging, extrusion, rolling, drawing, tube drawing). Carry out basic calculations in bulk and sheet metal processing. Understand basic and technological principles of sheet metal forming processes (shearing, bending, deep drawing). Design and specify the parameters of the metal forming processes.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	Project planning and management
Adapting to new situations	Respect for difference and multiculturalism
Decision-making	Respect for the natural environment
Working independently	Showing social, professional and ethical responsibility and sensitivity to gender issues
Team work	Criticism and self-criticism
Working in an international environment	Production of free, creative and inductive thinking
Working in an interdisciplinary environment
Production of new research ideas	Others...

Working Independently
 Decision making
 Search analyze and synthesize data and information with the use of the necessary technology
 Project Planning and Management
 Criticism and self-criticism
 Production of free creative and inductive thinking

(3) SYLLABUS

Introduction: Overview of the deformation Processes. Criteria for classification

Plasticity: Useful definitions and relationships from theory of plasticity. Phenomenological examination of mechanical properties of metals. Yield point and constitutional plastic equations. Work hardening law. Methods for determination of forming load. Plane strain and slip line field. Upper bound analysis. Friction Hill Analysis

Bulk forming operations: extrusion, rolling, drawing, forging. Technological characteristics, calculations. Friction and lubrication. Defects

Sheet metal forming. Formability, Principles of metal shearing, deep drawing, bending

Unconventional forming processes: Laser forming, explosive forming, peen-forming

LCA : Basic concepts

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face to face (in the class)	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	<ul style="list-style-type: none"> Search for forming technologies on the web Spreadsheet calculations 	
TEACHING METHODS <i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS</i>	Activity	Semester workload
	Lectures	56
	Educational visits	4
	Study and analysis of bibliography	40
	Independent Study	50
	Course Total (25 hours of work per credit unit)	150

<p>STUDENT PERFORMANCE EVALUATION</p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Language of evaluation: Greek</p> <p>Methods of evaluation: Final Exams</p>
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(5) ATTACHED BIBLIOGRAPHY

-Suggested bibliography:

- Kalpakjian S., Schmid S.R., Manufacturing Engineering and Technology, Pearson 2023.
- A. Antoniadis, Manufacturing Technology, Tziolas Publishing 2018 (in Greek)
- G.E. Dieter, Mechanical Metallurgy, MacGraw-Hill, 1988.
- ASM Handbook, Vol. 14A, 14B Metal Working Set, ASM 200
- W.F. Hosford and R.M. Caddell, Metal forming: mechanics and metallurgy, 2nd ed., Prentice Hall, 1993.
- W. A. Backofen, Deformation processing, Addison-Welsey Publishing Company, 1972.
- R. H. Wagoner, J.- L. Chenot, Fundamentals of Metal Forming, John Wiley & Sons Inc., 2000.

- Related academic journals:

- Journal of Manufacturing Processes, Elsevier
- Journal of Materials Processing Technology
- The International Journal of Advanced Manufacturing Technology, Springer