

a) General			
<i>School</i>	ENGINEERING		
<i>Academic unit</i>	MECHANICAL ENGINEERING		
<i>Level of studies</i>	Undergraduate		
<i>Course code</i>	MM908E01	<i>Semester</i>	8
<i>Course title</i>	<b>Production systems optimisation</b>		
<i>Independent teaching activities</i>		<i>Weekly teaching hours</i>	<i>ECTS</i>
Lectures		2	4
Laboratory exercises		2	
<i>Course type</i>	Knowledge deepening/consolidation		
<i>Course category</i>	Compulsory Elective for Direction 1/2		
<i>Prerequisite courses</i>	-		
<i>Language of instruction and examinations</i>	Greek		
<i>Is the course offered to Erasmus students</i>	Yes/No		
<i>Course website (url)</i>	<a href="https://ops.mech.uniwa.gr/">https://ops.mech.uniwa.gr/</a>		
b) Learning outcomes and general competences			
b1. Learning outcomes			
Upon successful completion of this course, the student will be able to:			
<ul style="list-style-type: none"> <li>- Understand the fundamentals of modeling and optimisation</li> <li>- Study, design and optimise energy and production systems</li> <li>- Familiarise with the characteristics of multicriteria analysis</li> <li>- Formulate and develop mathematical models for engineering problems</li> </ul>			
b2. General competences			
<ul style="list-style-type: none"> <li>- Search for, analysis and synthesis of data and information with the use of the necessary technology</li> <li>- Adapting to new situations</li> <li>- Decision-making</li> <li>- Working independently</li> <li>- Team work</li> <li>- Working in an interdisciplinary environment</li> <li>- Production of new research ideas</li> </ul>			
c) Syllabus			
<p>The aim of this course is to provide the foundations for studying, designing and optimising of production systems in general. The introduction of optimisation models and algorithms provide a framework to think about a wide range of issues that arise in manufacturing systems. The optimisation of energy systems is one of the core subjects of the module, for example the Pinch Analysis. The module also focuses in Multicriteria Analysis, Scenario Analysis and the implementation of mathematical optimisation in various manufacturing systems. Furthermore, modeling of simple and more complicated energy systems and the optimisation of energy systems in terms of integrated efficiency and profitability are also in detail analysed. Various case studies for the optimisation of a wide range of production systems are also included in the module syllabus.</p>			
d) Teaching and learning methods - Evaluation			
Delivery	Face-to-face, Case Studies, Workshops		

Use of information and communications technology	<ul style="list-style-type: none"> <li>- Commercial/free/open source software</li> <li>- MS Teams/Moodle</li> </ul>	
Teaching methods	<i>Activity</i>	<i>Semester workload</i>
	Lectures	26
	Tutorials	13
	Laboratory exercises	26
	Computational exercises	13
	Individual work	13
	Course total	130
Student performance evaluation	Final exam, Course Work and Written Assignments	
e) Suggested bibliography		
<ol style="list-style-type: none"> <li>1. Koukos Ioannis, 2007, "INTRODUCTION TO THE DESIGN OF CHEMICAL PLANTS [ΕΙΣΑΓΩΓΗ ΣΤΟ ΣΧΕΔΙΑΣΜΟ ΧΗΜΙΚΩΝ ΕΡΓΟΣΤΑΣΙΩΝ]", ISBN: 9789604181735, Ed. Tziola, Greece.</li> <li>2. Edgar, T.F., Himmelblau, D.M, 1987, "OPTIMIZATION OF CHEMICAL PROCESSES", ISBN: 9780070189911, Ed. McGraw Hill</li> <li>3. Ossenbruggen J. Paul, 1994, "FUNDAMENTAL PRINCIPLES OF SYSTEMS ANALYSIS AND DECISION-MAKING", ISBN: 9780471521563, Ed. John Wiley @ Sons, Inc</li> <li>4. Ravindran A., Ragsdell K. M., Reklaitis G.V., 2006, "ENGINEERING OPTIMISATION. METHODS AND APPLICATIONS", 2<sup>nd</sup> Edition, ISBN: 9780471558149, Ed. Wiley</li> <li>5. Sieniutycz Stanisław and Jeżowski Jacek, 2009, "ENERGY OPTIMISATION IN PROCESS SYSTEMS", eBook ISBN: 9780080914428, Ed. Elsevier</li> </ol>		