**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | ENGINEERING | | | | |
| **DEPARTMENT** | PRODUCT AND SYSTEMS DESIGN ENGINEERING | | | | |
| **LEVEL OF STUDIES** | GRADUATE | | | | |
| **COURSE CODE** | **MSCCAD16** | **SEMESTER** | | **1st** | |
| **COURSE TITLE** | **Computer Aided Manufacturing - CAM** | | | | |
| **INDEPENDENT TEACHING ACTIVITIES** *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* | | | **WEEKLY TEACHING HOURS** | | **CREDITS** |
| Lectures | | | **3** | | **6** |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |  | |  |
| **COURSE TYPE**  *general background,  special background, specialised general knowledge, skills development* | Special Background | | | | |
| **PREREQUISITE COURSES:** | NONE | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK/ENGLISH | | | | |
| **COURSE DELIVERED TO ERASMUS STUDENTS** | YES | | | | |
| **Module web page (URL)** | https://eclass.uowm.gr/ | | | | |

1. **LEARNING OUTCOMES**

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| **Learning outcomes** |
| The purpose of this course is to introduce postgraduate students to the Computer Aided Manufacturing processes and methods. Students are introduced to the creation of programs for CNC machines for product production, computer simulation of machining processes, and their production in CNC machines. It covers advanced CAD / CAM design and construction techniques and focuses deeply on the machining tool path optimization, on the verification of machining simulation and collision avoidance. The course lab consists of design exercises of solid modelling and the development of programs for their manufacture on CNC machines using the appropriate commercial CAD / CAM software.  **On successful completion of this module the learner will be able to:**  1. Acquire the necessary familiarity, required skills, the know-how and experience in handling real CNC machine tools  2. Be able to operate and programming CNC machines for processing on modern CNC milling and lathe machines.  3. Be able for easily reading, creating and editing CNC machine codes.  4. Be able to choose the right cutting tools and declare the correct cutting parameters each time.  5. Identify the risks that may arise at any time during CNC machining and ensure that errors can be avoided, thereby ensuring the high quality of machining.  6. Gain the ability to create CNC processing strategies and prepare the necessary phases.  7. To acquire the requisite ability to upgrade their knowledge and skills on their own through the targeted search for new methods of optimizing manufacturing techniques and processing strategies. |
| **General Skills** |
| **Upon successful completion of the program students will:**   * Have the theoretical and practical background on the field of Industrial Design and the corresponding profession. * Apply a wide range of scientific and technical knowledge concerning the design and development of industrial products. |

1. **Course Contents**

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| * The product cycle. The design process, the benefits of using CAD/CAM systems in manufacturing of a product. * Introduction to CAM Systems. CAM Hardware, CAM software, evaluation of CAM systems. * Introduction to machining and cutting tool materials. * Learn how to create G-code for cutting and its simulation. * Design based on CAD systems and machining based on CAM systems. * Practical training and construction of reference parts in training machine tools (milling machine, lathe). * Practical training on CNC machine tools (4-axis milling machine). * Checking and modifying of the final machine code (post-processing) |

1. **Teaching Methods - Assessment**

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| **MODE OFDELIVERY** | 1. THEORY In class, face to face 2. LABORATORY In laboratory facilities, face to face. |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** | * Use of appropriate CAD/CAM software * Video and slide presentations via projector * Support of teaching process via the electronic platform e-class |
| **TEACHING METHODS** | |  |  | | --- | --- | | ***Activity*** | ***Semester workload*** | | Lectures | 40 | | Semester project | 20 | | Laboratory exercises | 40 | | Non-directed study | 50 | | Course total | **150** | |
| **ASSESSMENT METHODS** | 1. THEORY:  Final written exam which includes:    1. Short-answer questions    2. Multiple choice questions    3. Problem solving 2. LABORATORY: Final exam which includes:    1. Laboratory exercise (designing a model, selecting and creating the right processing in order to reproduce the appropriate G code using CAD / CAM software) |

1. **ATTACHED**

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| *- Suggested bibliography:*   * CAD/CAM Theory and Practice, Ibrahim Zeid, McGraw Hill, 1991. * Mastering CAD/CAM, Ibrahim,Zeid, McGraw-Hill Education – Europe, 2004. * Συστήματα CAD/CAM και Τρισδιάστατη Μοντελοποίηση, Νικόλαος Μπιλάλης, Εμμανουήλ Μαραβελάκης, Εκδόσεις Κριτική, Αθήνα, 2009. * Βασικές αρχές συστημάτων CAD/CAM/CAE, Kunwoo Lee, Κλειδάριθμος, 2009. * Σχεδιασμός με Η-Υ, Παπαδόπουλος Χρήστος, Εκδόσεις Πανεπιστημίου Πατρών, 2000.   *- Related academic journals:* |