Syllabus

Basic data of the subject	
Academic unit:	**Faculty of Engineering and Informatics**
Title of the subject:	**Computer Aided Manufacturing**
Level:	**Master**
Course Status:	**Core**
Year of studies:	**II**
Number of hours per week:	**3**
Value of Credits - ECTS:	**6**
Time / location:	
Course lecturer:	**Prof. ass. dr. Riad Ramadani**
Contact details:	**riad.ramadani@ushaf.net**
Course Description	This course is to introduce Computer Aided Manufacturing (CAM) theory and applications. The course subjects also include CAD/CAM systems, Geometric modeling, mechanical assembly, mechanical tolerance, process planning and Tool path generation. Projects will focus on solid modeling for design and manufacturing applications and the use of commercial CAM software for automating the production cycle. Hands-on experience is attained through CNC machine tool laboratory and industry.
Objectives of the course:	The goal of the subject is to teach student with the theory and tools of Computer Aided Manufacturing (CAM) with and an emphasis on the central role of geometric model based on CAD and its seamless integration. It focuses on the integration of these tools and the automation of the product development cycle. It also covers the machining theory, types of cutting tools and engineering materials, automatic CNC machining as well as process planning.
Expected learning outcomes:	*Upon successful completion of this subject, student will be able to:* • *use and assess commercial CAM tools efficiently, effectively and intelligently in advanced engineering applications,* • *demonstrate practical skills in using a CAM program,* • *extend CAM technology for research and development purposes,* • *use InventorCAM software for multi-axis machining components that have complex non-orthogonal geometry.* • *explain the basic concepts of CNC programming and machining,*

	• *understand the structure and kinematics of a CNC machine and be able to select an appropriate number of axes and motors for the machine's design.*

Contribution to the student load (which must correspond with learning outcomes)			
Activity	**Hour**	**Day/Week**	**In total**
Lectures with lab tutorials	4	15	60
Internship	3	4	12
Contacts with teacher / consultations	1	4	4
Field exercises	2	5	10
Midterm, seminars and projects.	2	2	4
Homework	2	4	8
Self-learning time student (at the library or at home)	2	15	30
Final preparation for the exam	4	4	16
Time spent on evaluation (tests, quiz and final exam)	2	2	4
Projects and presentations.	1	2	2
Total			**150**

Teaching methodology:	Lectures combined with laboratory work as well as workshops with CNC machines
Assessment methods:	Final Exam 50% Assignment 50%
Literature	
Basic Literature:	1. Ibrahim Z., Mastering CAD/CAM, McGraw-Hill, Inc, 2005 2. Zhuming Bi, Xiaoqin Wang, Computer Aided Design and Manufacturing, John Wiley & Sons Ltd, 2020 3. InventorCAM 2019, User guide, www.autodesk.com
Additional Literature:	4. Lee, K., Principles of CAD/CAM/CAE Systems, Addison-Wesley, Reading, Massachusetts, 1999 5. P Nageswara Rao, CAD/CAM: Principles and applications, 3rd edition, Mc Graw Hill, Inc, 2010
Ratio between theory and practice	*40% Theory* *60% Practical work*

Designed learning plan	
Week:	**Lectures and exercises to be held**
Week one:	*CAD/CAM theory*
Week two:	*Introduction to CAD/CAM*
Week three:	*Geometric modeling*

Week four:	*Converting 2D and 3D CAD drawings.*
Week five:	*Integration of Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM).*
Week six:	*The modern development of prototypes and their methods of processing, learning the use of software.*
Week seven:	*Product manufacturing and management*
Week eight:	*Future directions for CAD/CAM*
Week nine:	*CNC tools*
Week ten:	*InventorCAM package, 2D milling (labs)*
Week eleven:	*InventorCAM package, 3d milling (labs)*
Week twelve:	*InventorCAM package, multi-axis milling (labs)*
Week thirteen:	*InventorCAM package, turning (labs)*
Week fourteen:	*CNC machining (labs)*
Week fifteen:	*CNC machining (labs)*

Academic policies and rules of conduct
Regular attendance of lectures and exercises is necessary, as well as active participation with discussion and solution of tasks. Not impeding the progress required for learning using mobile phones turned off or in silent mode.