Syllabus

Basic data of the subject	
Academic unit:	**Faculty of Engineering and Informatics**
Title of the subject:	**Automation and Computer Integrated Manufacturing (CIM)**
Level:	**Master**
Course Status:	**Elective course**
Year of studies:	**2**
Number of hours per week:	**3**
Value of Credits - ECTS:	**6**
Time / location:	
Course lecturer:	**Prof. Ass. Dr. Gjelosh Vataj**
Contact details:	**Gjelosh.Vataj@ushaf.net**
Course Description	*This subject offers a broad understanding of automation in any manufacturing industry and projects the need of cost and time reduction for quality improvement. Also, the concept of low-cost production is also covered in this syllabus.*
Objectives of the course:	*In this course, students will learn:* • *Develop an understanding of classical and state-of-the-art production systems, control systems, management technology, cost systems, and evaluation techniques.* • *Develop an understanding of computer-integrated manufacturing (CIM) and its impact on productivity, product cost, and quality.* • *Obtain an overview of computer technologies including computers, database and data collection, networks, machine control, etc, as they apply to factory management and factory floor operations.* • *Describe the integration of manufacturing activities into a complete system* • *Acquire sensitivity to human-factors related issues as they affect decision making in the factory environment.*

Expected learning outcomes:	*Upon successful completion of this subject, student will be able to:* • *Understand the fundamentals of production technology and shop floor planning used in industries.* • *Analyze the managerial decision taken to control production rate or cost of production for optimizing the problem on hand.* • *Judge the importance of Mechatronics Engineering, a multidisciplinary branch of engineering.* • *Finalize alternate method of manufacturing using the concept of automation.*

Contribution to the student load (which must correspond with learning outcomes)

Activity	Hour	Day/Week	In total
Lectures with lab tutorials	3	15	45
Internship			
Contacts with teacher / consultations	2	5	10
Field exercises			
Midterm, seminars and projects.	3	5	15
Homework			
Self-learning time student (at the library or at home)	3	15	45
Final preparation for the exam	3	10	30
Time spent on evaluation (tests, quiz and final exam)	2	2	4
Projects and presentations.	1		1
Total			**150**

Teaching methodology:	*The subject takes 15 weeks with 2 hours of lectures and 1 hour weekly individual and group exercises.* *Exercises will be held in the form of individual and group work in which concrete examples will be discussed.* *Active participation is extremely important so students are encouraged to attend lectures and exercises regularly and contribute to the discussions that take place in lectures.* *Lectures, exercise, individual work, discussions and group work.*
Assessment methods:	*First test 35%, Second test 35%,* *research paper 20%,* *participation and activity 10%.* *Final exam result - 70% (or First test 35%, Second test 35%)*
Literature	

Basic Literature:	1. Systems Approach to Computer Integrated Design and Manufacturing **Nanua Singh, John Wiley & Sons**, Inc publication, 2. *Automation, Production Systems, and Computer-Integrated Manufacturing* 4th Edition***, Mikell P. Groover***
Additional Literature:	*1.* Automation, Production System and Computer Integrated Manufacturing, 3th Edition, M.P. Groover, PHI publication
The ratio of theory and practice	*Theory 60% with exercises and 40% laboratory work.*

Designed learning plan	
Week:	**Lectures and exercises to be held**
Week one:	*Introduction* *Automation; Manufacturing operations and production facilities*
Week two:	*Production performance, Realizing CIM and future trends in manufacturing*
Week three:	*Concurrent Engineering* *Serial versus concurrent engineering; benefits of concurrent engineering*
Week four:	*Characterization, difficulties and techniques of concurrent engineering*
Week five:	*Manufacturing Planning and Control System* *Demand management; Material requirement planning; MRP lot sizing problem; capacity planning; shop floor control*
Week six:	*Just-in-Time Manufacturing System* *Pull versus push system; types of Kanban; Alternative JIT systems; Just–in-Time purchasing; barrier and benefits of JIT*
Week seven:	*Test 1*
Week eight:	*Group Technology and Computer Aided Process Planning* *Importance of Group Technology (GT), various classification and coding system used in GT, machine sequencing, machine grouping, Steps in developing process planning*
Week nine:	*Process planning approaches; variant and generative process planning system*
Week ten:	*Flexible Manufacturing Systems and Automated Material Handling System* *Types of flexibilities; components of FMS*
Week eleven:	*Layout consideration; FMS benefits, Analysis of automated storage and retrieval (AS/RS) system; automated guided vehicles (AGVs)*
Week twelve:	*Study visits to companies to see: Assembly Lines Manual and Automated assembly lines.*
Week thirteen:	*Study visits to companies to see: Work station consideration; alternative assembly lines Presentation.*
Week fourteen:	*Presentation*
Week fifteen:	*Test 2*

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.