EASTERN MEDITERRANEAN UNIVERSITY
Faculty of Engineering
Department of Industrial Engineering
COURSE OUTLINE
Fall 2023-2024

COURSE CODE	IENG447	**COURSE LEVEL**	Fourth Year
COURSE TITLE	Computer Integrated Manufacturing	**COURSE TYPE**	Selected Elective
CREDIT VALUE	(3, 0, 1) 3	**ECTS Credit Value**	6
PRE-REQUISITE(S)	IENG431 or consent of the instructor	**CO-REQUISITE(S)**	-

	Name(s)	**E-mail**	**Office**	**Telephone**
LECTURER	Ramtin Nazerian	ramtin.nazerian@emu.edu.tr	IE-C209	2820
Lecture hours	Mondays 12:30–14:30 and Tuesdays 12:30-14:30		IE-F101	
Lab hours	Tuesdays 16:30-18:30 and Fridays 14:30-16:30		CIM LAB	

CATALOG DESCRIPTION
CIM definitions, CIM benefits. Components of CIM architecture. Integrative Manufacturing Planning and Control, Integration of information into material flow in manufacturing. Group technology, Concurrent engineering, Enterprise Resource Planning (ERP), Introduction to CAD/CAM and Numerical Control, Flexible Manufacturing Systems, Robotics, Material Handling Systems. Programmable Logic Controllers for manufacturing and Wireless & RFID sensors. Classification of production systems. Digital manufacturing, application of Virtual reality in CIM.

COURSE OBJECTIVES
1. Help the students gain understanding of application of computers in industry (Contributing SO 1, 2, 6).
2. Familiarize the student with engineering topics in manufacturing and non-manufacturing environments such as ERP, Group Technology, Lean Manufacturing, JIT, and Concurrent Engineering (Contributing SO 1, 2, 3, 5, 6, 7).
3. Developed student's knowledge of programmable logic control systems, automation, digital manufacturing (Contributing SO 1, 2, 5, 6, 7).
4. Expand their knowledge about fundementals of Industry 4.0 (Contributing SO 2, 3, 4, 5, 6, 7).

COURSE LEARNING OUTCOMES
On successful completion of this course, students are expected to develop knowledge and understanding of:
1. The concept, architecture and implementation of CIM.
2. Concurrent engineering, Design for manufacturing and design for assembly.
3. Design and control of integrated manufacturing systems via virtual reality
4. The control logic of the industrial automation hardware and their integration
5. Different types of Material Handling Systems
6. Information modeling of manufacturing process
7. Concept of Industry 4.0, its implementation, and challanges

On successful completion of this course, students are expected to develop their skills in:
8. Enterprise modeling for CIM integration
9. Design and product life-cycle management for integrated manufacturing
10. Numerical control and CNC programming
11. Programming industrial robot operations
12. Configuring and operating flexible manufacturing systems
13. Application of Virtual reality in CIM
14. Sensors, robots, conveyor belts and industrial software /hardware principles

On successful completion of this course, students are expected to develop their appreciation of and respect for values and attitudes regarding the issues of:
15. Communicate with experts in the various disciplines related to computer control of machines and processes
16. Try to induce company managers to implement CIM by clarification of the benefits obtained
17. Understand the impact of CIM implementation in global, environmental and societal context
18. The importance of team work and cooperation in real world practices
19. The importance of effective communication
20. The importance of oral presentation(s), written report(s) with regard to topics covered in the course.

CONTRIBUTION OF THE COURSE TO MEETING THE REQUIREMENTS OF CRITERION 5

Mathematics and Basic Sciences : -
Engineering Topics : 3
General Education : -

TEXTBOOK AND SUPPLEMENTARY MATERIALS

Mikell P. Groover, Automation Production Systems, and Computer Integrated Manufacturing, Fifth edition, Prentice Hall, ISBN 978-0-13-349961-2

Ortiz, J. H. (2020). *Industry 4.0: Current status and future trends*. London, England: IntechOpen.

Light Machines Corp., proLIGHT1000 Machining Center User's Guide, 1996, Publication: 34-7111-0003

Intelitek Inc. Open CIM for Industrial Training Applications Software Version 5, 2019 Cat.# 100094 Rev. L

COURSE CONTENT & WEEKLY SCHEDULE

Week	Topics	Assessment Methods (%)
1	Introduction to CIM its Defenition and Architecture	
2	Numerical Control in CIM and FMS	
3	Group Technology and process planning	
4	CAD/CAM and Concurrent Engineering	
5	MHS, Wireless and RFID sensors	Quizzes: 10 HWs: 10 Presentation: 20 NC (LAB): 5 VCIM (LAB): 10 FMS (LAB): 10 Final exam 35
6	PLC	
7	FMS	
8	ERP and Application of VR in Manufacturing	
9	Introduction to Mechatronic and Numerical Control	
10	CNC Milling Machine	
11	Virtual Robot, Virtual Milling Cell, and Virtual Assembly	
12	Concept of Industry 4.0	
13	Final Exam	

Relationship of the Course to Student Outcomes

Student Outcomes	Level of Contribution		
	No	Moderate	High
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	☐	☐	☑
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	☐	☐	☑
(3) an ability to communicate effectively with a range of audiences	☐	☐	☑
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	☑	☐	☐
(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	☐	☐	☑
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	☐	☑	☐
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	☐	☑	☐

Grading Criteria

Quizzes: Depending on the course progress speed, students should expect 2-4 quizzes from the lecture materials. The date and topics of each quiz are going to be announced in advance to the students.

HomeWorks: During the class, HWs will be provided for the students. The deadline for each homework will be certain and late submissions will not be considered for grading. In case of a reasonable excuse, providing supporting documents, some students may be granted an extension of submission.

Presentation: Groups will be formed among the students during the semester and each group will be assigned a topic related to CIM. Each group needs to research the given topic. During the class hours or at a certain time provided by the lecturer, each group needs to orally present its topic. The evaluation and grading will be a combination of group and individual work as well as creativity in providing visual aids. Students are given the chance to form their team themselves.

LAB: During the lab hours, providing the necessary training to the students, each individual would perform the related task on the computer. If applicable, their work will be executed by the robots. Grades are given according to the individual's performance. Students who are not paying attention to the safety rules given by the instructors will be dismissed from the lab sessions and no grade will be considered for the LAB throughout the semester. Due to safety reasons, no robot movement should be carried out by the students without the supervision of the instructor.

Final exam: There will be a final exam at the end of the semester on all the topics discussed in the lab and the lecture hours. A calculator, ruler, pencil, and eraser are the required pieces of equipment that students need to bring to the exam session.

Attendance: Students are expected to attend all the lectures, exams, and LAB sessions. Attending less than 75% of the sessions not only would be considered for grading but also may result in receiving an NG grade on the transcript.

Please note that the instructor reserves the right to modify these percentages in case he finds it necessary. Letter grade equivalents of numerical performances will be announced by the Registrar's Office after the last day for the submission of letter grades.

Office Hours: If students have difficulty in understanding any material after they have tried their best, they should consult their instructor during their office hours. However, if you wish to meet the instructor outside of their office hours, please call him by phone or send an e-mail first to make an appointment.

ACADEMIC HONESTY - PLAGIARISM

Cheating is copying from others or providing information, written or oral, to others. Plagiarism is copying without acknowledgement from other people's work. According to university by laws cheating and plagiarism are serious offences punishable with disciplinary action ranging from simple failure from the exam or project, to more serious action (letter of official warning suspension from the university for up to one semester). Disciplinary action is written in student records and may appear in student transcripts.

PLEASE KEEP THIS COURSE OUTLINE FOR FUTURE REFERENCE AS IT CONTAINS IMPORTANT INFORMATION!

I read and understood the rules of the course.

Full name:

Student ID: **Signature:**