DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
MECHANICAL ENGINEERING PROGRAM, BSC.

Course Syllabus

1. **Course number and name**
   MExxx Computer Aided Manufacturing

2. **Credits and contact hours**
   (3+0) 3 credit hours, 3 contact hours

3. **Course type**
   Blended Learning Course (2+1)

4. **Instructor's or course coordinator's name**
   Dr. Mohammad Nasir

5. **Textbook information**
   Ibrahim Zeid , Mastering CAE/CAM (Engineering Series), 2004
   ISBN-13: 978-0072868456

   a. **Other supplemental materials**
      Instructor's notes

6. **Specific course information**
   a. **Catalog description**
      Principles of CAE/CAM including engineering drawing, geometric and surface modelling, and feature-based design. Use of CAE/CAM software in CNC programming, sheet-metal design, Plastic Mold design and manufacturing, 3d printing machines and FEM analysis.

   b. **Prerequisites or co-requisites**
      Prerequisite: ME XXX Computer aided design

   c. **The course is:**
      Elective in Mechanical Engineering programs.

7. **Specific goals for the course**
   a. **Course outcomes:**
      After completion of the course, students are expected to be able to:
   1. Understand the basic concepts of CAE/CAM including the principles and practice of computer aided solid modelling and its applications to manufacturing.

2. Be familiar with the application of the CAE CAM in many fields: Sheetmetal design and manufacturing, additive manufacturing, and CNC machine.
3. Practice Mold design basics and using the CAE CAM to design and manufacturing plastic injection molds.
4. Understand the finite element basic principles, and its applications and advantages.

b. The following student outcomes are addressed by the course:

SO-(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.

SO-(4) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environmental, and societal context.

SO-(pc) The structure of the curriculum must provide both breadth and depth across the range of engineering topics implied by the title of the program.

8. Learning Outcomes and their Alignment with Program Educational Objective (PEO's), Methods of Delivery, and Assessment Methods:

Learning Outcomes	Program PEOs	Method of Delivery	Assessment Method
Course Outcomes			
CO-(1): Understand the basic concepts of CAE/CAM including the principles and practice of computer aided solid modelling and its applications to manufacturing.	-	Online lectures	Assignment
CO-(2): Be familiar with the application of the CAE CAM in many fields: Sheetmetal design and manufacturing, additive manufacturing, and CNC machine.	-	Lectures (Example and Problems)	Project
CO-(3): Practice Mold design basics and using the CAE CAM to design and manufacturing plastic injection molds.	-	Lectures (Example and Problems)	Project

CO-(4): understand the finite element basic principles, and its applications and advantages.		Lectures (Example and Problems)	Final exam
Student Outcomes			
SO-(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.	2	Lectures (Example and Problems)	Midterm Exam
SO-(4) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environmental, and societal context.	1, 3	Term Project	Term Project-Part 2
SO-(pc) The structure of the curriculum must provide both breadth and depth across the range of engineering topics implied by the title of the program.	1	Term Project	Term Project-Part 1

9. Weekly Teaching Plan

Week No.	Lecture	Topic	Method of Delivery
1	Sun (9-10)	Introduction to CAE CAM	Lecture
	Tue (9-10)	Introduction to CAE CAM usage in problem solving	Lecture
	Thu (9-10)	Case study	Online lecture
2	Sun (9-10)	Introduction to CNC	Lecture
	Tue (9-10)	Introduction to CNC	Lecture
	Thu (9-10)	Introduction to CAE software (Creo)	Online lecture
3	Sun (9-10)	The use of CAE CAM in CNC	Lecture
	Tue (9-10)	The use of CAE CAM in CNC	Lecture

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	Thu (9-10)	Application using software.	Online Lecture/ synchronous
4	Sun (9-10)	The use of CAE CAM in CNC	Lecture
	Tue (9-10)	The use of CAE CAM in CNC	Lecture
	Thu (9-10)	Generating G code using CAM software.	Online Lecture
5	Sun (9-10)	Sheet metal basics	Lecture
	Tue (9-10)	Sheet metal with CAE CAM	Lecture
	Thu (9-10)	Sheet metal design application using software.	Online Lecture
6	Sun (9-10)	Additive manufacturing	Lecture
	Tue (9-10)	Additive manufacturing types	Lecture
	Thu (9-10)	Case studies	Online Lecture
7	Sun (9-10)	3d printer working principle	Lecture
	Tue (9-10)	3d printer working principles	Lecture
	Thu (9-10)	3d printer with software	Online Lecture
8	Sun (9-10)	CAE CAM applications with casting process	Lecture
	Tue (9-10)	CAE CAM applications with casting process	Lecture
	Thu (9-10)	Software application	Online Lecture
9	Sun (9-10)	Plastic injection machine	Lecture
	Tue (9-10)	Plastic injection machine	Lecture
	Thu (9-10)	Case study	Online Lecture
10	Sun (9-10)	Plastic injection mold design	Lecture
	Tue (9-10)	Plastic injection mold design	Lecture

	Thu (9-10)	Software example	Online Lecture
11	Sun (9-10)	Plastic injection mold design	Lecture
	Tue (9-10)	Plastic injection mold design	Lecture
	Thu (9-10)	Software application	Online Lecture
12	Sun (9-10)	Plastic injection mold manufacturing	Lecture
	Tue (9-10)	Plastic injection mold manufacturing	Lecture
	Thu (9-10)	Software application	Online Lecture
13	Sun (9-10)	FEM	Lecture
	Tue (9-10)	FEM	Lecture
	Thu (9-10)	Software application on FEM	Online Lecture
14	Sun (9-10)	Design project	Lecture
	Tue (9-10)	Design project	Lecture
	Thu (9-10)	Design project	Online Lecture
15	Sun (9-10)	Discussion and presentations	Lecture
	Tue (9-10)	Discussion and presentations	Lecture
	Thu (9-10)	Discussion and presentations	Online Lecture

10. Grade Distribution:

Assessment	Grade	Week No.
- Midterm Exam	30%	7th Week
-Assignments (Reports /Quizzes/ Seminar / Tutorials/ Home works ….)	30%	1-16th Week
- Final Examination	40%	16th Week

Note: Make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.

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