

CRN 24294 MKS 536E **Advanced Computer Aided Design**
Spring 2023-2024 Syllabus (Course Application Document, 12.02.2024)

Faculty:

Prof. Dr. Hikmet Kocabas,

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Office Hours: Tuesday 11:30-15:30, Thursday 12:30-15:30, Friday 10:30-13:30,

Lectures: Friday 14:30-17:30, hybrid teaching, in classroom D360.

Course Description:

In this course, Overview of existing CAE systems;
architecture of high-performance graphic displays in engineering workstations;
orthographic and perspective display transformations;
Parametric representation of curves and surfaces;
elementary differential geometry; interactive graphics; bicubic surface paths;
image generation; NC tool paths; solid modeling; advanced research topics;
project management for software development,
Rapid Prototyping Methods, Automation in Manufacturing,
Automatic Programming, Reverse Engineering.

Text Book:

1. Zeid, Ibrahim, CAD/CAM Theory and Practice , McGraw Hill , 1991
2. Piegl, Les ; Tiller, Wayne, The NURBS Book, Springer-Verlag, 1997.

References:

1. Chiyokura, Hiroaki; Solid Modelling with DESIGNBASE, Addison-Wesley Publishing Company, 1988.
2. Rogers, D.F., Adams, J.A., Mathematical Elements for Computer Graphics, McGraw Hill, 1990.
3. Toriya, H., Chiyokura, H., 3D CAD Principles and Applications, Springer-Verlag, 1991.
4. V. B. Anand, Computer and Geometric Modeling for Engineers, John Wiley & Sons, 1993
5. Hoffmann, C.M., Geometric & Solid Modeling, An Introduction, Morgan Kaufmann Publishers Inc., 1989.

Course Objectives:

This course is an introduction to the rapidly growing fields of CAD systems and aims to develop an understanding of CAD related problems.

The course has four main objectives:

1. Understand the fundamental and advanced concepts in computer graphics and computer-aided design
2. Know the functions of a geometric solid modeler and how to use any particular modeler for modeling an object and the different ways of manipulating it

Course Outcomes:

Students will demonstrate:

1. An understanding of computer graphics systems and geometric modeling
2. An understanding of curves and wire frame, surface and solid models

Weekly Course Plan:

Week	Topics	
1	Advanced CAD Technologies,	February 16, 2024
2	2D/3D Geometric Modeling Equations	February 23, 2024
3	2D/3D Modeling Transformations	March 01, 2024
4	Parametric polynomial equations of Curves, Contiuity,	March 08, 2024
5	Parametric equations of Hermite Curves, homework: 3d drawing?	March 15, 2024
6	Parametric equations of Bezier Curves,	March 22, 2024
7	Properties of Curves, B-Splines, NURBS	March 29, 2024
8	Parametric Surfaces, Solid Modeling methods	April 05, 2024
	- - - Ramadan holiday week	April 08 to 14 - - - April 12, 2024
9	Parametric Prog. of Features API Project, due date of homework	April 19, 2024
10	API (Application Program Interface) Program	April 26, 2024
11	AutoCAD AutoLisp, DCL, Rhino	May 03, 2024
12		MidtermExam May 10, 2024
13	Boundary Representation (B-Rep) of Solids,	May 17, 2024
14		API Project due date May 24, 2024
		End of Spring Semester May 24, 2024

Grading:

- 1 HW Assignment (10%) One homework assignment will be given to promote. **due date of homework, April 19, 2024**
- 1 Term Project (20%) Term project will be related with API programming. **April 26, 2024**
Details will be announced later. **Due date of project, May 24, 2024**
- 1 Midterm exam (30%) One midterm exam will be given during lecture hours. **May 10, 2024**
- 1 Final exam (40%) Final exam will cover all the topics of the course. **May 27 - June 21, 2024**

Grading Rules:

Late homeworks will not be evaluated. Repeating the assignments is not possible.

It is compulsory to ATTEND at least 70 % of the class according to university regulations.

Others:

Additional announcements on the course will be provided by e-mail and in the web site:

<http://www.ninova.itu.edu.tr>