SARDAR RAJA COLLEGE OF ENGINEERING, ALANGULAM

DEPARTMENT OF CIVIL ENGINEERING

MICRO LESSON PLAN

SUBJECT : COMPUTER AIDED DESIGN OF STRUCTURE

CODE : CE807

CLASS : IV Year / VIII SEM

STAFF: Mrs. M.AJITHA, Asst.Prof,

DEPT. OF CIVIL ENGG

CE 807 COMPUTER AIDED DESIGN OF STRUCTURE L T P C

OBJECTIVE 3 0 0 3

The main objective of this programme is to train the student in the use of computers and creating a computer code as well as using commercially available software for the design of Civil Engineering structures.

UNIT I INTRODUCTION

Fundamentals of CAD – Hardware and Software requirements – Design process – Applications and benefits.

UNIT II COMPUTER GRAPHICS

Graphic primitives – Transformations – Wireframe Modelling and Solid Modelling – Graphic standards – Drafting packages.

UNIT III STRUCTURAL ANALYSIS

Fundamentals of Finite Element Analysis – Principles of structural analysis – Analysis packages and applications.

UNIT IV DESIGN AND OPTIMISATION

Principles of Design of steel and RC Structures – Applications to simple design problems – Optimisation techniques – Algorithms – Linear Programming – Simplex method.

UNIT V EXPERT SYSTEMS

Introduction to artificial intelligence – Knowledge based Expert Systems – Rules and decision tables – Inference mechanisms – Simple applications.

TEXT BOOKS

1 Groover M.P. and Zimmers E.W. Jr., "CAD/CAM, Computer Aided Design and Manufacturing",Prentice Hall of India Ltd, New Delhi,1993.

2 Krishnamoorthy C.S.Rajeev S., "Computer Aided Design",Narosa Publishing House,New Delhi,1993.

REFERENCES

1 Harrison H.B.,"Structural Analysis and Design",Part I and II pergamon Press,Oxford,1990.

2 Rao S.S.,"Optimisation Theroy and Applications ",Wiley Eastern Limited, New Delhi,1977

. 3 Richard Forsyth (Ed), "Expert System Principles and Case Studies", Chapman and Hall, London,1989.

SUBJECT DESCRIPTION AND OBJECTIVES

DESCRIPTION

Beginning in the 1980s computer-aided design programs reduced the need of draftsmen significantly, especially in small to mid-sized companies. Their affordability and ability to run on personal computers also allowed engineers to do their own drafting work, eliminating the need for entire departments. In today's world, many students in universities do not learn manual drafting techniques because they are not required to do so. The days of hand drawing for final drawings are all but over. Universities no longer require the use of protractors and compasses to create drawings, instead there are several classes that focus on the use of CAD software.

Current computer-aided design software packages range from 2D vector-based drafting systems to 3D solid and surface modelers. Modern CAD packages can also frequently allow rotations in three dimensions, allowing viewing of a designed object from any desired angle, even from the inside looking out. Some CAD software is capable of dynamic mathematical modeling, in which case it may be marketed as CADD.

CAD is used in the design of tools and machinery and in the drafting and design of all types of buildings, from small residential types (houses) to the largest commercial and industrial structures (hospitals and factories).

CAD is mainly used for detailed engineering of 3D models and/or 2D drawings of physical components, but it is also used throughout the engineering process from conceptual design and layout of products, through strength and dynamic analysis of assemblies to definition of manufacturing methods of components. It can also be used to design objects. Furthermore many CAD applications now offer advanced rendering and animation capabilities so engineers can better visualize their product designs.

CAD has become an especially important technology within the scope of computer-aided technologies with benefits such as lower product development costs and a greatly shortened design cycle. CAD enables designers to layout and develop work on screen, print it out and save it for future editing, saving time on their drawings

OBJECTIVE

- The main objective of this programme is to train the student in the use of computers and creating a computer code as well as writing program using commercially available software for the design of civil engineering structures.
- CAD Softwares is used to increase the productivity of the designer,improve the quality of design improve the communications through the documentation and to create a data base for manufacturing.

MICRO LESSON PLAN

NO.OF HOURS	LECTURE TOPICS	READINGS
	UNIT I INTRODUCTION	
1	Introduction about computer	T-2
2	Fundamentals of CAD	T-2
3	Hardware requirements (AV Class)	T-2
4	Software requirements (AV Class)	T-2
5	Design process	T-2
6	Software tools	T-2
7	Designer vs computer	T-2
8	Applications	T-2
9	Benefits	T-2
	UNIT II COMPUTER GRAPHICS	
10	Introduction: Graphics devices	T-2
11	Graphics primitives	T-2
12	Transformations	T-2
13	Wireframe modeling, surface modeling	T-2
14	Solid modeling (AV Class)	T-2
15	Graphics standards	T-2
16	GKS-Introduction	T-2
17	Computer Aided Drafting	T-2
18	Drafting Packages	T-2
	UNIT III STRUCTURAL ANALYSIS	
19	Introduction (AV Class)	T-2
20	Fundamentals of FEA	T-2
21	Principles of structural analysis	T-1,T-2
22	FEA Program-Pre-Processor	T-2
23	Post Processor	T-2
24	Processor	T-2
25	Analysis packages	T-2
26	Current trends in FEA Software	T-2
27	Applications	T-2
	UNITIV DESIGN AND OPTIMISATION	
28	Principles of design of steel structures	T-2

29	Principles of design of RC structures	T-2
30	Applications to simple design problems	T-1,T-2
31	Optimizations Techniques	T-2
32	Algorithms (AV Class)	T-2
33	Linear Programming	T-2
34	Simplex method	T-2
35	Software for optimal design	T-2
36	Recent Advances in design optimization	T-2
UNIT V EXPERT SYSTEMS		
37	Introduction to Artificial intelligence (AV Class)	T-2
38	Knowledge based Expert systems	T-2
39	Stages in expert system development	T-2
40	Knowledge representation	T-2
41	Rules and Decision table	T-2
42	Decision tables	T-2
43	Inference mechanisms	T-2
44	Blackboard Architecture	T-2
45	Simple applications	T-2