

Academic Course Description

<p>BHARATH UNIVERSITY Faculty of Engineering and Technology Department of Mechanical Engineering BME 604- CAD/CAM Sixth Semester, 2016-17 (EVEN Semester)</p>
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Course (catalog) description

This course will enable the student to gain knowledge about the basic fundamentals of CAD.

Compulsory/Elective course : Compulsory

Credit & contact Hours : 3 & 45

Course Coordinator : Dr.Balambika

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in)	Consultation
Mr. N. Lenin Rakesh	IV Year Mech,	JR 001,	9789917001	leninrakesh.mech@bharathuniv.ac.in	9.00 to 9.50 am
Mr. Arun V Rejus Kumar	IV Year Mech,	JR 002	9789492493	Karthikeyan.mech@bharathuniv.ac.in	10.50 to 11.40
Mr. S.Nakeeran	IV Year Mech,	JR 003 JR 004	9445126016	Nakeeran.mech@bharathuniv.ac.in	11.40 to 12.30
Mrs.C.M. Meenakshi	IV Year Mech,	JR 101 JR 102	9500015643	meenakshi.mech@bharathuniv.ac.in	9.50 to 10.40

Relationship to other courses:

Pre –requisites : Manufacturing Technology-I

Assumed knowledge : To gain knowledge on how computers are integrated at various levels of planning and manufacturing understand computer aided planning and control and computer monitoring.

Following courses :

Syllabus Contents

UNIT I INTRODUCTION TO CAD AND ITS ELEMENTS

9

Principles of Computer hardware, Software and Operating System, application Programs, Data Handling and File Structures, Computer aid in Phases of design- Development of Design Database using CAD Systems- Conceptual Design Process Analysis Optimization- Detailed Design and Documentation.

UNIT II ELEMENTS OF CAD SYSTEMS AND DESIGN USING COMPUTERS 9

Elements of CAD Systems, Introduction to Graphic Hardware, Software, Details of 2D Software Packages- Layering, Drawing Primitives, Display Techniques, Editing, utilities, Scaling, Dimensioning, 3D Visualization, Geometric Modeling- Wireframe and Solid models.

UNIT III DESIGN USING COMPUTERS 9

Design of Gears, Couplings, Flywheels, Shafts Connecting Rods etc. Software for Vibration Problems- Stress Analysis, Kinematic Analysis, Dynamic Analysis.

UNIT IV COMPUTER AIDED MANUFACTURING 9

Numerical Control- Modes- NC Elements- NC Machine Tools- CNC Machines- CNC Hardware Basics- CNC Tooling- CNC Machine Tools and Control System- Part Programming- Manual and Computer Aided- Turning Center Programming- Advanced Part Programming- Direct Numerical Control- Adaptive Control- Computer Aided Part Programming, APT. Introduction to Robotics, Group Technology, Computer Aided Process Planning, FMS.

UNIT V COMPUTER INTEGRATED MANUFACTURING 9

CIM as a Concept and a Technology- CASA/SME Model of CIM- Benefits- Communication Matrix in CIM- Fundamentals of Computer Communication in CIM, CIM Data Transmission Method, Serial, parallel, asynchronous, modulation, Demodulation, Simplex and Duplex- Types of Communications in CIM- Point to Point, Star and Multiplexing- CIM for Batch Production- Group Technology – FMS- Process Control in CIM- Characteristics of Manufacturing Process Data- Continuous, Analog, Discrete Binary and Pulse Data- ADC/DC Multiplexers, Process Monitoring Through Computer- Types of Computer Process Control- Preplanned, Direct Digital Control (DDC)- Regular Control and Feed Forward Control, Requirements of Control Programming Interrupt, Real Time Clock Input.

TEXT BOOKS:

1. Radhakrishnan P. CAD/CAM/CIM, I Edition, New central Book Agency, 2006.

REFERENCES:

1. Rao P.N. CAD/CAM, Principles and Application, Tata McGraw Hill, 2005.
2. Mikell P. Groover, Automation, Production Systems and CIM, II Edition, Prentice Hall of India, 2001.
3. Chris McMahon and Jimmy Browne, CAD/CAM, Pearson Education, 2001.
4. sbmpme.blogspot.com/2011/01/cad-cam-cim-p-radhakrishnan.html

Computer usage: Nil

Professional component

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

Broad area: Computer Integrated Manufacturing

S.NO	Topics	Problem solving (Yes/No)	Reference
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Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	February 2 nd week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2 nd week	Session 15 to 28	2 Periods
3	Model Test	April 3 rd week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

This course will enable the student To gain knowledge about the basic fundamentals of CAD.	Correlates to program outcome		
	H	M	L
1. To gain knowledge on how computers are integrated at various levels of planning and manufacturing understand computer aided planning and control and computer monitoring.	a, b	i	l
2. Understand the concepts of CAD/CAM			
3. Understand writing programs	c, f	g, h	l
4. Understand to give command	d	g, k	l
5. Learn to draw 2D drawings			
6. Learn to do 3D modeling			l

Mapping of Instructional Objectives with Program Outcome

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Unit 1 INTRODUCTION TO CAD AND ITS ELEMENTS			
1.	Principles of Computer hardware	No	[T1] [R2]
2.	Software and Operating System	No	
3.	application Programs	No	
4.	Data Handling and File Structures	No	
5.	Computer aid in Phases of design	No	
6.	Development of Design Database using CAD Systems	No	
7.	Conceptual Design Process Analysis Optimization	No	
8.	Detailed Design	No	
9.	Detailed Documentation	No	
UNIT II ELEMENTS OF CAD SYSTEMS AND DESIGN USING COMPUTERS			
10.	Elements of CAD Systems	No	[T1] [R2]
11.	Introduction to Graphic Hardware and Software	No	
12.	Details of 2D Software Packages	No	
13.	Layering	No	
14.	Drawing Primitives	No	
15.	Display Techniques	No	
16.	Editing	No	
17.	utilities, Wireframe and Solid models	No	
18.	Scaling, Dimensioning, 3D Visualization	No	
UNIT III DESIGN USING COMPUTERS			
19.	Design of Gears	No	[T1],[R2]
20.	Design of Couplings	No	
21.	Design of Flywheels	No	
22.	Design of Shaft	No	
23.	Design of Connecting Rod	No	
24.	Software for Vibration Problems	Yes	
25.	Stress Analysis	Yes	
26.	Kinematic Analysis	Yes	
27.	Dynamic Analysis.	Yes	
UNIT IV COMPUTER AIDED MANUFACTURING			
28.	Numerical Control- Modes- NC Elements	No	[T1] [R2]
29.	NC Machine Tools	No	
30.	CNC Machines- CNC Hardware Basics	No	
31.	CNC Tooling- CNC Machine Tools and Control System	No	
32.	Part Programming - Manual	No	
33.	Part Programming- Computer	No	
34.	Turning Center Programming	No	
35.	Computer Aided Part Programming	No	
36.	Computer Aided Process Planning	No	
UNIT V COMPUTER INTEGRATED MANUFACTURING			
37.	CIM as a Concept and a Technology	No	
38.	CASA/SME Model of CIM-Benefits	No	
39.	Communication Matrix in CIM	No	
40.	Fundamentals of Computer Communication in CIM	No	

41.	CIM Data Transmission Method, Serial , parallel, asynchronous, modulation, Demodulation	No	[[T1] [R2]
42.	Simplex and Duplex- Types of Communications in CIM- Point to Point, Star and Multiplexing	No	
43.	Discrete Binary and Pulse Data- ADC/DC Multiplexers	No	
44.	Direct Digital Control (DDC)- Regular Control and Feed Forward Control	No	
45.	Requirements of Control Programming Interrupt, Real Time Clock Input.	No	

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	10%
Assignment / Seminar / Online		
Test / Quiz	-	5%
Attendance	-	5%
Final exam	-	70%

Addendum

ABET Outcomes expected of graduates of B.Tech / MECH / program by the time that they graduate:

- The ability to apply knowledge of mathematics, science, and engineering fundamentals.
- The ability to identify, formulate and solve engineering problems.
- The ability to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- The ability to design and conduct experiments, as well as to analyze and interpret data
- The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- The ability to apply reasoning informed by the knowledge of contemporary issues.
- The ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- The ability to understand professional and ethical responsibility and apply them in engineering practices.

- i) The ability to function on multidisciplinary teams.
- j) The ability to communicate effectively with the engineering community and with society at large.
- k) The ability in understanding of the engineering and management principles and apply them in project and finance management as a leader and a member in a team.
- l) The ability to recognize the need for, and an ability to engage in life-long learning.

Program Educational Objectives

PEO1: PREPARATION:

Mechanical Engineering graduates are enthusiastic to provide strong foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems in the field of Mechanical Engineering.

PEO2: CORE COMPETENCE:

Mechanical Engineering graduates have competence to enhance the skills and experience in defining problems in the field of Mechanical Engineering and Technology design and implement, analyzing the experimental evaluations, and finally making appropriate decisions.

PEO3: PROFESSIONALISM:

Mechanical Engineering graduates made competence to enhance their skills and embrace new thrust areas through self-directed professional development and post-graduate training or education.

PEO4: PROFICIENCY:

Mechanical Engineering graduates became skilled to afford training for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS:

Mechanical Engineering graduates are morally merged to apply the ethical and social aspects of modern Engineering and Technology innovations to the design, development, and usage of new products, machines, gadgets, devices, etc.

BME 604- CAD/CAM

Course Teacher	Signature
Mr. N. Lenin Rakesh	
Mr. Arun V Rejus Kumar	
Mr. S.Nakeeran	
Mrs.C.M.Meenakshi	

Course Coordinator
Dr.Balambika

HOD/MECH