Academic Course Description

BHARATH UNIVERSITY

Faculty of Engineering and Technology

Department of Mechanical Engineering

BME 012-JIGS FIXTURES AND PRESS TOOLS

Seventh Semester, 2015-16 (odd Semester)

Course (catalog) description

To understand the functions and design principles of Jigs, fixtures and press tools To gain proficiency in the development of required views of the final design.

Compulsory/Elective course: Elective for Mechanical students

Credit hours **:** 3 credits

Course Coordinator J.GOLDEN RENJITH NIMAL

Instructor(s) **:** C.M.MEENAKSHI, HARIHARAN,DURAIRAJ,

Name of the instructor	Class handling	Office location	Office phone	Email (domain: @bharathuniv.ac.in)	Consultation
C.M.MEENAKSHI	FINAL year MECH	JR105		meenakshi.mech@ bharathuniv.ac.in	9.00 - 9.50 AM
C.M.MEENAKSHI	FINAL year MECH	JR201		meenakshi.mech@ bharathuniv.ac.in	1.30 to 2.20 PM
HARIHARAN	FINAL year MECH	JR202		hariharan.mech@ bharathuniv.ac.in	10.50 TO 11.40 AM
DURAIRAJ	FINAL year MECH	JR203		durairaj.mech@ bharathuniv.ac.in	11.40 TO 12.30 PM

Relationship to other courses

Pre-requisites : MANUFACTURING TECHNOLOGY

Assumed knowledge : Machine operations and Machine Tools

Following courses : Nil

Syllabus Contents

UNIT I LOCATING AND CLAMPING DEVICES **12**

Introduction to jigs & Fixtures - Design principles of jigs & fixtures - Locating principles and elements – Standard parts – Clamping devices, Mechanical ,Pneumatic and hydraulic actuation, Clamping force analysis.

UNIT II JIGS **12**

Drill bushes - Different types of jigs- plate, latch, channel, box, post, angle plate, angular post, turnover, pot jigs - Automatic drill jigs – Rack & pinion operated and Air operated jig components - Design and development of jigs for the given components.

UNIT III FIXTURES **12**

Types of fixtures - Boring, Lathe, Milling, Broaching fixtures – Grinding, Planning and Shaping fixtures – Assembly, Inspection and Welding fixtures – Modular fixtures – Design and development of fixtures for the given components.

UNIT IV PRESS TOOLS **12**

Press working terminology - Types of Presses and Press Accessories – Computation of capacities and tonnage requirements – Strip layout

UNIT V DIES **12**

Design and development of various types of Cutting, Forming and Drawing dies – Blank development for cylindrical and non cylindrical shells – Compound , Progressive and Combination dies.

TEXTBOOK:

1. Design of Jigs, Fixtures and Press tools, C.Elanchezhian,T.Sunderselvan, B.Vijayaramnath, Eswar Press, 2005.

REFERENCES :

1. ASTME Handbook of Fixture design,1960.
2. Fundamentals of tool Design ASTME, 1984.
3. Akgoroshkin, Jigs and Fixture Handbook, Mix Publishers, Moscow, 1983 .
4. Design Data, PSG Tech, Coimbatore, 2003.
5. https://www.overdrive.com/media/.../design-of-**jigs-fixtures-and-press-to**...

Computer usage: Nil

Professional component

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

Broad area : | Engineering

Test Schedule

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

Mapping of Instructional Objectives with Program Outcome

To understand the functions and design principles of Jigs, fixtures and press tools To gain proficiency in the development of required views of the final design.	Correlates to program outcome		
	H	M	L
Will gain knowledge on locating and clamping devices	a		
Will understand the types and use of jigs	a,c,l,l	d	
Will learn the use and design of fixtures	C,l	f	
Will learn and design the use of press tools	A,b	h	k.l
Learn types of presses	a		l
Understand concept of dies	A,b		

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

Draft Lecture Schedule

Lecture No.	Topic (Unit No.)	No of hrs	PROBLEM SOLVING	Reference Books
1	Introduction to the subject		NO	T1
2	**Unit –I Locating and clamping devices** Different between jigs and fixture	**1**	NO	T1
3	Principle ,features and materials of J&F	**2**	NO	T1
4	Locating principle and locating elements	**2**	NO	T1
5	Clamping principle and elements	**1**	NO	T1
	Clamping force analysis	**1**	YES	T1
	Hydraulic and pneumatic clamping	**1**	NO	T1
6	**Unit-II Jigs** Introduction to jigs, drill bushes	**1**	NO	T1
7	Types of jigs	**2**	NO	T1

8	Design of jig for pipe elbow	**1**	YES	T1
9	Design of jig for flange	**1**	YES	T1
10	Design of different type of jigs like post,box..etc.	**2**	YES	T1
	Hydraulic and pneumatic jigs	**1**	NO	T1
11	**Unit-III Fixtures** Fixture design and std fixture components	**2**	YES	T1
12	Type of fixture	**2**	YES	T1
13	Design consideration for fixture design	**2**	YES	T1
14	Tutorial on fixture design	**2**	YES	T1
15	**Unit- IV: Press Tools** Press working terminology -	**1**	NO	T1
	Types of Presses and Press Accessories	**2**	NO	T1
16	Computation of capacities and tonnage requirements – Strip layout	**5**	YES	T1
20	**Unit –V: Dies** Design and development of various types of Cutting, Forming and Drawing dies.	**2**	YES	T1
21	Blank development for cylindrical and non-cylindrical shells	**3**	YES	T1
22	Compound, Progressive and Combination dies.	**3**	YES	T1
	Total No of Hrs	**45**		T1

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.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.
- Slide presentations and video demos.

Evaluation Strategies

Cycle Test – I	-	10%
Cycle Test – II	-	10%
Model Test	-	25%
Attendance	-	5%
Final exam	-	50%

Prepared by: **Dated :**

C.M.Meenakshi

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

a) The ability to apply knowledge of mathematics, science, and engineering fundamentals.

b) The ability to identify, formulate and solve engineering problems.

c) 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.

d) The ability to design and conduct experiments, as well as to analyze and interpret data

e) The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

f) The ability to apply reasoning informed by the knowledge of contemporary issues.

g) The ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

h) 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 graduatesare 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.

COURSE TEACHER	SIGNATURE
C.M.MEENAKSHI	
HARIHARAN	
V.P.DURAIRAJ	

CO-ORDINATOR **HOD**

C.M.MEENAKSHI