

**Academic Course Description**

BHARATH UNIVERSITY  
 Faculty of Engineering and Technology  
 Department of Mechanical Engineering  
**BME305 - MANUFACTURING TECHNOLOGY –I**  
 Third Semester, 2015-16 (odd Semester)

**Course (catalog) description**

To apply the thermodynamic concepts into various thermal application like IC engines, Steam Turbines, Compressors and Refrigeration and Air conditioning systems.

- Compulsory/Elective course** : Compulsory
- Credit & contact hours : 3 & 60
- Course Coordinator : Mr.V.P.Durai Raj
- Instructors** : Mr.S.Thirumavalavan, Mr. Karthikeyan,

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in)	Consultation
Mr. S.Thirumavalavan	Third Sem “A”	SK001		Thirumavalavan.mech@bharathuniv.ac.in	Tuesday 12.30 to 01.30
Mr.S. Karthikeyan	Third Sem “B”	SK002		karthikeyan.mech@bharathuniv.ac.in	
Mr. S.Karthikeyan	Third Sem “C”	SK003		karthikeyan.mech@bharathuniv.ac.in	Wednesday 12.30 to 01.30

**Relationship to other courses:**

- Pre –requisites : Basic mechanical Engg.,
- Assumed knowledge : knowledge of forging, metal processing, extrusion, metal cutting process, tool life, Lathe description,types,drilling, special lathe machines etc.
- Following courses : manufacturing technology-II, Automobile Engineering.

## Syllabus Contents

- UNIT I METAL WORKING PROCESS 12**  
Mechanical working of metals-hot and cold working-rolling, extrusion, spinning, wire- drawing, press working. Welding - different types of gas and arc welding process, soldering and brazing. Casting-different types, furnaces, casting defects and inspection.
- UNIT II THEORY OF METAL CUTTING 12**  
Introduction, mechanics of metal cutting- chip formation, Merchant's circle theory, cutting force calculations, tool materials, Influence of tool angles, tool life, cutting fluids, machining time calculations, Metal cutting economics, problem in merchant circle, tool life, machining time and economics.
- UNIT III MACHINING PROCESSES 12**  
Lathe- introduction, types, construction, mechanisms and attachments for various operations, nomenclature of single point cutting tool. Capstan and turret lathes: various mechanisms, tool and loading arrangement. Automatic lathes- single spindle and multi spindle mechanisms.
- UNIT IV SHAPER, PLANER AND MILLING PROCESS 12**  
Shaper, planer and slotter : types, specification, mechanisms, holding devices, difference between shaper and planer. Milling machine - types and specification, mechanisms, holding devices, milling operations. Milling tool nomenclature, indexing types-simple, compound and differential.
- UNIT V DRILLING, BORING AND BROACHING 12**  
Drilling, Boring- Specification. Nomenclature of drilling and reaming tool and its specification. Broaching: Specification, types, mechanisms, nomenclature of broaching tool.

**TOTAL NO. OF PERIODS: 60**

### **Text Books:**

1. P.C. Sharma, *A text book of production technology*, S.Chand & company ltd., New Delhi, 2007.
2. P.N.Rao. *Manufacturing Technology-foundry forging &welding TMH publishing co., New Delhi -2009.*

### **Reference:**

- W.A.J.chapman-work shop technology, vol I,II & III, 1975, ELBS.  
Roy A Llinberg, *Process and material manufacture*, PHI, 1995  
Kalpakjian, *manufacturing engineering and technology*, Addison Wesley, 2005  
Hajra Chowdary S K *The fundamentals of work shop technology Vol. I &II*,  
Media publishers,1997

**Total : 45 Hours**

## Computer usage:

### Professional component

General	-	5%
Basic Sciences	-	10%
Engineering sciences & Technical arts	-	75%
Professional subject	-	10%

### Broad Area:

#### Manufacturing Technology

### Test Schedule

S.No	Test	Tentative Date	Portion	Duration
1	Cycle Test - 1	25.08.2016	Session 1 to 15	100 Min
2	Cycle Test – 2	29.09.2016	Session 16 to 35	100 Min
3	Model Test	28.10.2016	Session 1 to 45	3 Hrs
4	University Examination	22.11.2016	Session 1 to 45	3 Hrs

### Mapping of Instructional Objectives with Program Outcome

		Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H											
	CO2		M										
	CO3												
	CO4										H	M	
	CO5						L				H		M
	CO6							H			H		
3	Category	Humanities and Social studies (HS)		Basic Sciences & Maths (BS)		Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project Seminar/ Internship (DP)		
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4	Approval	37 <sup>th</sup> Meeting of Academic Council, May 2015											

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

## Draft Lecture Schedule

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
<b>UNIT I METAL WORKING PROCESS</b>			
1	Mechanical working of metals-hot cold working	No	T1 – Chapter 4
2	hot and cold rolling	No	T1 – Chapter 4
3	extrusion, spinning	No	T1 – Chapter 4
4	wire- drawing, press working	No	T1 – Chapter 4
5	Metal Forming Processes	No	T1 – Chapter 4
6	Casting	No	T1 – Chapter 3
7	Types of casting, furnaces,	No	T1 – Chapter 3
8	casting defects and inspection.	No	T1 – Chapter 3
9	Welding-types	No	T1 – Chapter 5
10	gas and arc welding process		T1 – Chapter 5
11	soldering and brazing		T1 – Chapter 5
<b>UNIT II THEORY OF METAL CUTTING</b>			
12	The Mechanics of Chip Formation	NO	T1 – Chapter 6
13	Merchant's circle theory	NO	T1 – Chapter 6
14	cutting force calculations	Yes	T1 – Chapter 6
15	tool materials, Influence of tool angles	NO	T1 – Chapter 7
16	tool life	Yes	T1 – Chapter 6
17	cutting fluids	NO	T1 – Chapter 7
18	machining time calculations	Yes	T1 – Chapter 6
19	Metal cutting economics	NO	T1 – Chapter 6
20	problem in merchant circle	Yes	T1 – Chapter 8
<b>UNIT III MACHINING PROCESSES</b>			
21	Lathe- introduction	NO	T1 – Chapter 8
22	types, construction, mechanisms	NO	T1 – Chapter 8
23	attachments for various operations	NO	T1 – Chapter 8
24	nomenclature of single point cutting tool	NO	T1 – Chapter 6
25	Capstan and turret lathes	NO	T1 – Chapter 8
26	tool and loading arrangement	NO	T1 – Chapter 8
27	Automatic lathes	No	T1 – Chapter 8
28	single spindle and multi spindle mechanisms.	No	T1 – Chapter 8
<b>UNIT IV SHAPER, PLANER AND MILLING PROCESS</b>			
29	Shaper, planer and slotter	No	T1 – Chapter 8
30	Types of Shaper	No	T1 – Chapter 8
31	Specification and mechanisms	No	T1 – Chapter 8
32	holding devices	No	T1 – Chapter 8

33	difference between shaper and planer	No	T1 – Chapter 8
34	Milling machine - types	No	T1 – Chapter 8
35	specification, mechanisms, holding devices	No	T1 – Chapter 8
36	milling operations	No	T1 – Chapter 8
37	Milling tool nomenclature	No	T1 – Chapter 8
38	indexing types	No	T1 – Chapter 8
<b>UNIT V DRILLING, BORING AND BROACHING</b>			
39	Drilling, Boring	No	T1 – Chapter 8
40	Boring- Specification	No	T1 – Chapter 8
41	Nomenclature of drilling	No	T1 – Chapter 8
42	Nomenclature of reaming tool	No	T1 – Chapter 8
43	its specification	No	T1 – Chapter 8
44	Broaching: Specification	No	T1 – Chapter 8
45	nomenclature of broaching tool	No	T1 – Chapter 8

### 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%

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Prepared by Mr.S.Thirumavalavan

## **Addendum**

### **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 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.

BME305 - Manufacturing Technology –I

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<b>S.No</b>	<b>Course Teacher</b>	<b>Signature</b>
1	Mr.Thirumavalavan	
2	Mr. S.karthikeyan	
3	Mr. S.karthikeyan	

**Course Coordinator**

Mr.V.P.Durai Raj

**HOD/MECH**