

## Academic Course Description

BHARATH UNIVERSITY  
 Faculty of Engineering and Technology  
 Department of Civil Engineering  
**BME 101 – ENGINEERING GRAPHICS- E**  
**First Semester, 2017-18 (odd Semester)**

### Course (catalog) description

To understand techniques of drawings in various fields of engineering

**Compulsory/Elective course : Compulsory**

Credit & Contact hours : 4 Credits, 60 Hours

Course Coordinator : Dr.Shabirulla

**Instructors :**

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuni.ac.in)	Consultation
Dr.Shabirulla	First Year ECE, EEE				9.00 a.m – 10.40 a.m
Mr. Jeswin Arputhabalan	First Year CSE, ECE				2.20 pm – 4.00 pm
Mr. Ramalingam	First Year ECE				1.30 p.m – 3.10 p.m
Mr. Saravana Kumar	First Year EEE				1.30 p.m – 3.10 p.m
Mr. Sathish Kumar	First Year CSE				2.20 pm – 4.00 pm
Mr. Thirupathi Raja	First Year CSE				9.00 a.m – 10.40 a.m
Mrs. Meenakshi	First Year EEE				9.00 a.m – 10.40 a.m

### Relationship to other courses:

Pre –requisites : +2 Level Maths & Physical Science

Assumed knowledge : Basic drawing instruments usage knowledge

Following courses : Machine drawing

## Syllabus Contents

### UNIT 1 ABSIC CURVES, PROJECTION OF POINTS AND STRAIGHT LINES

6+6 hours

Conics-construction of ellipse, parabola and hyperbola by eccentricity method-construction of cycloids- construction of involutes of square and circle-Drawing of tangent and normal to the above curves-Scales-Basic drawing conventions and standards-Orthographic projection principles- Principal planes-First angle projection- Projection of points. Projection of straight lines (only first angle projections) inclined to both the principal planes- Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces.

### UNIT II PROJECTIONS OF PLANES AND SOLIDS

6+6 hours

Projection of planes (Polygonal and circular surfaces) inclined to both the principal planes. Projection of simple solids like prisms, pyramids, cylinder, cone, tetrahedron and truncated solids when the axis is inclined to one of the principal planes/ both principal planes by rotating object method and auxiliary plane method.

### UNITIII ORTHOGRAPHIC PROJECTIONS, ISOMETRIC PROJECTIONS & FREEHANDSKETCHING

6+6 hours

Orthographic projection of Simple parts from 3D diagram-Principles of isometric projection and isometric view-isometric scale- Isometric projections of simple solids and truncated solids-Prisms, pyramids, cylinders, cones-combination of two solid objects in simple vertical positions and miscellaneous problems Free hand sketching of orthographic & Isometric projection

### UNITIV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES

6+6 hours

Sectioning of solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other-obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids- Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes.

### UNIT V PERSPECTIVE PROJECTION, BUILDING DRAWING AND COMPUTER AIDED DRAFTING

6+6 hours

Perspective projection of simple solids-Prisms, Pyramids and cylinders by visual ray method. Introduction-components of simple residential or office building-specifications-plan and elevation of different types of Residential buildings and office buildings. Introduction to drafting packages and basic commands used in AUTO CAD. Demonstration of drafting packages.

**Total : 60 HOURS**

#### TEXT BOOKS:

- T1. N.D.Bhatt and V.M.Panchal, "Engineering Drawing", Charotar Publishing House, 50<sup>th</sup> Edition, 2010.  
T2. K.V.Natarajan "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2009.

#### REFERENCES:

- R1. K.R.Gopalakrishna, "Engineering drawing", (Vol-I & II combined) Subhas stores, Bangalore, 2007.  
R2. K.Venugopal and V. Prabhu Raja, "Engineering Graphics", New Age International Private limited, 2008.  
R3. Luzzader, Warren.J., and Duff, John.M., "Fundamentals of Engineering Drawing with an introduction to Interactive computer graphics for design and production", Eastern Economy Edition, Prentice Hall of India Pvt Ltd, New Delhi, 2005.

**Computer usage:** Exposure to AutoCAD (5 hours)

#### Professional component

General	-	20%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	80%

**Broad area :**

Technical drawing

**Test Schedule**

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 2nd week	Session 1 to 30	2 Periods
2	Cycle Test-2	September 2nd week	Session 30 to 60	2 Periods
3	Model Test	October 2nd week	Session 1 to 60	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

**Mapping of Instructional Objectives with Program Outcome**

To understand techniques of drawings in various fields of engineering and develop skill to produce accurate drawings	Correlates to program outcome		
	H	M	L
1. To know about different types of lines & use of different types of pencils in an Engineering Drawing	a,l		
2. To know how to represents letters & numbers in drawing sheet	b	a,l	
3. To know about different types of projection		l	c
4. To know projection of points ,straight lines, solids etc	h,i		f,l
5. To know development of different types of surfaces.	i		c,l
6. To know about isometric projection	j		c,l

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

**Draft Lecture Schedule**

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
<b>UNIT 1 ABSIC CURVES, PROJECTION OF POINTS AND STRAIGHT LINES</b>			
1.	Introduction	No	T1/T2 Chapter 1  R1
2.	Conics – Construction of ellipse by eccentricity method	Yes	
3.	Construction - parabola and hyperbola by eccentricity method	Yes	
4.	construction of cycloids	Yes	
5.	construction of involutes of square and circle	Yes	
6.	Drawing of tangent and normal to conics and involutes	Yes	
7.	Scales-Basic drawing conventions and standards	No	
8.	Orthographic projection principles- Principal planes	No	
9.	First angle projection- Projection of points.	Yes	
10.	Projection of straight lines inclined to both the principal planes	Yes	
11.	Determination of true lengths and true inclinations by rotating line method	Yes	
12.	Trapezoidal method and traces.	Yes	
<b>UNIT II PROJECTIONS OF PLANES AND SOLIDS</b>			
13.	Projection of planes - introduction	No	T1, T2 Chapter 2  R2
14.	Inclined to both the principal planes.	Yes	
15.	Inclined to both the principal planes.	Yes	
16.	Projection of prisms	Yes	
17.	Problems on Prisms	Yes	
18.	Projection of pyramids	Yes	
19.	Projection of pyramids	Yes	
20.	Projection of cylinder	Yes	
21.	Projection of cone	Yes	
22.	Projection of cone	Yes	
23.	Projection of tetrahedron and truncated solids	Yes	
24.	Projection of tetrahedron and truncated solids	Yes	
<b>UNIT III ORTHOGRAPHIC PROJECTIONS, ISOMETRIC PROJECTIONS &amp; FREEHANDSKETCHING</b>			
25.	Introduction to Orthographic projection	No	T1, T2 Chapter 3  R1
26.	Orthographic projection of Simple parts from 3D diagram	Yes	
27.	Principles of isometric projection and isometric view	No	
28.	Isometric scale- Isometric projections of simple solids and truncated solids	Yes	
29.	Isometric projection of Prisms	Yes	
30.	Prisms and pyramids	Yes	
31.	Isometric projection of Pyramids	Yes	
32.	Isometric projection of cylinders	Yes	
33.	Isometric projection of cones	Yes	
34.	Isometric view of combination of two solid objects in simple vertical positions	Yes	

35.	Free hand sketching of orthographic	Yes	
36.	Free hand sketching of Isometric projection	Yes	
<b>UNITIV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES</b>			
37.	Introduction to section of solids - Sectioning of solids in simple vertical position	No	T1, T2 Chapter 4 R1
38.	Sectioning of Prisms	Yes	
39.	Sectioning of Prisms, Pyramids	Yes	
40.	Sectioning of Cylinders and Cones	Yes	
41.	Section of solids - Cones	Yes	
42.	Obtaining true shape of section	Yes	
43.	Development of lateral surfaces of simple and sectioned solids	No	
44.	Development of sectioned Prisms	Yes	
45.	Development of sectioned Pyramids	Yes	
46.	Development of sectioned cylinders and cones	Yes	
47.	Development of lateral surfaces of solids with cut-outs and holes.	Yes	
48.	Problems on development of solids with holes	Yes	
<b>UNIT V PERSPECTIVE PROJECTION, BUILDING DRAWING AND COMPUTER AIDED DRAFTING</b>			
49.	Perspective projection of simple solids	No	T1 Chapter 5 R2 R3
50.	Perspective view of Prisms	Yes	
51.	Perspective view of Pyramids	Yes	
52.	Problems on perspective projection of pyramids	Yes	
53.	Perspective drawing of cylinders by visual ray method	Yes	
54.	Introduction- components of simple residential or office building-specifications	No	
55.	Plan and elevation of different types of Residential buildings and office buildings.	No	
56.	Building drawing problems residential	Yes	
57.	Building drawing problems office buildings	Yes	
58.	Introduction to AUTO CAD	No	
59.	Basic commands used in AUTO CAD	Yes	
60.	Simple drafting in AutoCAD	Yes	

### 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 technical 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	-	5%
Assignment	-	5%
Attendance	-	10%
Final exam	-	70%

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**Prepared by Dr. Shabirulla**

Dated :

## **Addendum**

### **ABET Outcomes expected of graduates of B.Tech / Civil / 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.

<b>Course Teacher</b>	<b>Signature</b>
Dr.Shabirulla	
Mr. Jeswin Arputhabalan	
Mr. Ramalingam	
Mr. Saravana Kumar	
Mr. Sathish Kumar	
Mr. Thirupathi Raja	
Mrs. Meenakshi	

**Course Coordinator**

**HOD/Civil**