Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Electrical and Electronics Engineering

BME 102 – ENGINEERING GRAPHICS

First Semester, 2017-18 (odd Semester)

Course (catalog) description

To understand techniques of drawings in various fields of engineering

Compulsory/Elective course : Compulsory

Credit and contact hours : 3 & 45

Course Coordinator : Mr.Karthik

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Mr. Saravana Kumar	First Year	First Year	-	askumarwins@gmail.com	**12.30 – 1.00 p.m**
Mr.Karthik	First Year	First Year	-		**12.30 pm – 1.00pm**

Relationship to other courses:

Pre –requisites **:** +2 Maths & +2 Physics

Assumed knowledge : Basic drawing instruments usage knowledge

Following courses : Machine drawing

Syllabus Contents

UNIT 1 BASIC CURVES, PROJECTION OF POINTS AND STRAIGHT LINES 9 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 9 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 9 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 9 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 9 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: 45 hours

TEXT BOOKS:

T1. N.D.Bhatt and V.M.Panchal, "Engineering Drawing", Charotar Publishing House, 50th 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	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	100%
Professional subject	-	0%

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		
2. To know how to represents letters & numbers in drawing sheet	b	a	
3. To know about different types of projection		b	c
4. To know projection of points ,straight lines, solids etc	h,i		f
5. To know development of different types of surfaces.	i		c
6. To know about isometric projection	j		c

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

Draft Lecture Schedule

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT 1 ABSIC CURVES, PROJECTION OF POINTS AND STRAIGHT LINES			
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	
UNIT II PROJECTIONS OF PLANES AND SOLIDS			
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	
UNITIII ORTHOGRAPHIC PROJECTIONS, ISOMETRIC PROJECTIONS & FREEHANDSKETCHING			
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	
UNITIV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES			
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	
UNIT V PERSPECTIVE PROJECTION, BUILDING DRAWING AND COMPUTER AIDED DRAFTING			
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	-	10%
Assignments/Seminar/online test/quiz	-	5%
Attendance	-	5%
Final exam	-	70%

Prepared by Mr.Saravana Kumar Dated :

Addendum

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

a) An ability to apply knowledge of mathematics, science, and engineering
b) An ability to design and conduct experiments, as well as to analyze and interpret data
c) An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) An ability to function on multidisciplinary teams
e) An ability to identify, formulate, and solve engineering problems
f) An understanding of professional and ethical responsibility
g) An ability to communicate effectively
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) A recognition of the need for, and an ability to engage in life-long learning
j) A knowledge of contemporary issues
k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Educational Objectives

PEO1: PREPARATION
Electronics Engineering graduates are provided with a strong foundation to passionately apply the fundamental principles of mathematics, science, and engineering knowledge to solve technical problems and also to combine fundamental knowledge of engineering principles with modern techniques to solve realistic, unstructured problems that arise in the field of Engineering and non-engineering efficiently and cost effectively.

PEO2: CORE COMPETENCE
Electronics engineering graduates have proficiency to enhance the skills and experience to apply their engineering knowledge, critical thinking and problem solving abilities in professional engineering practice for a wide variety of technical applications, including the design and usage of modern tools for improvement in the field of Electronics and Communication Engineering.

PEO3: PROFESSIONALISM Electronics Engineering Graduates will be expected to pursue life-long learning by successfully participating in post graduate or any other professional program for continuous improvement which is a requisite for a successful engineer to become a leader in the work force or educational sector.

PEO4: SKILL
Electronics Engineering Graduates will become skilled in soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, interpersonal relationship, group discussion and leadership ability to become a better professional.

PEO5: ETHICS
Electronics Engineering Graduates are morally boosted to make decisions that are ethical, safe and environmentally-responsible and also to innovate continuously for societal improvement.

Course Teacher	Signature
Mr. Saravana Kumar	
Mr. Karthik	

Course Coordinator **HOD/ECE**