

Course Code		:	1BMEA104 / 204N	Introduction to Mechanical Engineering	Semester	:	01 / 02
L:T:P		:	3:0:0		Course Type	:	ESC - I
Hours/Sem.	Teaching	:	42 Hrs		CIE Marks	:	50
	Learning (TW)	:	42 Hrs		SEE Marks	:	50
	Exam	:	06 Hrs		Total Marks	:	100
	Total Hrs.	:	90 Hrs		Credits	:	03

Professional Competency:

This course enables non-mechanical engineering students to acquire basic mechanical engineering knowledge required for multidisciplinary engineering applications.

Course Outcomes:

After completion of the course, student will be able to:

CO1: Explain the properties and applications of engineering materials and composite materials.

CO2: Apply the concepts of power plants, machine tool operations and joining processes in industrial contexts.

CO3: Determine the performance (Power and Efficiency) of IC engine and. Identify the components and working of IC Engine and refrigeration system.

CO4: Identify and describe the components, systems, and applications of mechatronics, gear drives, CNC, robotics and electric vehicle & hybrid vehicle.

UNIT-I

10 Hrs

Introduction: Role of Mechanical Engineering in Industries and Society. Streams in mechanical engineering and their relevance/significance.

Energy Sources and Power Plants: Basic working principles of Hydel power plant, Nuclear power plant, Solar power plant and Wind power plant

Engineering materials: Introduction, Classification, Ferrous and Non-Ferrous metals: Types, Properties and their applications.

Composite materials: Introduction, Constituents of a composite, Classification, Types of Matrix and Reinforcement materials, Advantages, Disadvantages and Applications of composite materials.

UNIT-II

11 Hrs

Machine Tool Operations:

Working Principle of lathe, Lathe operations: Turning, facing, knurling. Working principles of Drilling Machine, drilling operations: drilling, reaming and tapping. Working of Milling Machine, Milling operations: plane milling, face milling and end milling. (No sketches of machine tools, sketches to be used only for explaining the operations).

Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantages and applications of CNC, 3D printing.

Joining Processes: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding and types of flames.

UNIT-III

11 Hrs

Introduction to Refrigeration and Air Conditioning: Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, Working principle of room air conditioner.

Introduction to IC Engines: Components and Working Principles, 4-Stroke Petrol and Diesel Engines, Application of IC Engines, Numerical.

Insight into Future Mobility; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of EVs and Hybrid vehicles.	
UNIT-IV	10 Hrs
Power Transmission systems: Classification of gears, simple & compound gear trains, concepts of automatic and CVT transmission. Automation technology: Definition of automation, types of automation, basic elements of automation and advantages. Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Classification based on robotics configuration: polar cylindrical, Cartesian coordinate and spherical. Application, Advantages and disadvantages. Integrated system: Need for integration of technologies, ADAS (Advanced Driver Assistance System).	
Text Books:	
1. K R Gopala Krishna, "Elements of Mechanical Engineering", Subhash Publications, 38th Edition, 2018. 2. Hazra Choudhry and Nirzar Roy, "Elements of Workshop Technology (Vol. 1 and 2)", Media Promoters and Publishers Pvt. Ltd, 17th edition, 2023.	
Reference Books:	
1. Appu Kuttan KK, "Robotics", I K International Publishing House Pvt Ltd, 2013. 2. Jonathan Wickert and Kemper Lewis, "An Introduction to Mechanical Engineering", Global Engineering. 5th Edition, September 2023. 3. Mikell P. Groover, "Automation, production systems and computer integrated manufacturing", Prentice Hall, 5th Edition, 2021.	
Web links and Video Lectures (e-Resources):	
1. https://www.vlcsolutions.com/blog/artificial-intelligence-in-manufacturing/ 2. https://www.neuralconcept.com/post/how-is-ai-used-in-mechanical-engineering 3. https://www.youtube.com/watch?v=MKiiXubKaGM 4. https://www.youtube.com/watch?v= canCYWZPsc 5. https://www.youtube.com/watch?v=IQ-MYnyxh7M	

Table: Matrix to describe the mapping of COs with POs (considering Wks) and PSOs

Course Outcomes (COs)	Program Outcomes and (Wks)											Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO1	2 (WK1 and WK3)							1			1	1	
CO2	2 (WK1 and WK3)					1 (WK5)		1			1	1	
CO3	2 (WK1, WK2 and, WK3)							1			1	1	
CO4	2 (WK1 and WK3)				1 (WK6)			1			1	1	

Course Code		:	1BMEA105 / 205 N	Elements of Mechanical Engineering	Semester	:	01 / 02
L:T:P		:	3:0:0		Course Type	:	PSC
Hours/Sem.	Teaching	:	42 Hrs		CIE Marks	:	50
	Learning (TW)	:	42 Hrs		SEE Marks	:	50
	Exam	:	06 Hrs		Total Marks	:	100
	Total Hrs.	:	90 Hrs		Credits	:	03

Professional Competency:

This course enables mechanical engineering students to acquire fundamental mechanical engineering knowledge and skills to understand concept, apply and solve basic engineering problems in manufacturing, energy, thermal, and automation systems.

Course Outcomes:

After completion of the course, student will be able to:

- CO1: Apply the concepts of steam turbine, water turbine, power plants, machine tool operations and Joining processes in industrial contexts.
- CO2: Calculate the energy of steam and performance parameters (power and efficiency) of IC Engine.
- CO3: Identify the components, systems, and applications of mechatronics, CNC, robotics and electric vehicle and hybrid vehicle in automation and manufacturing processes.
- CO4: Determine velocity ratio of gear drives and power transmitted through power transmission system.

UNIT-I

10 Hrs

Introduction to Mechanical Engineering (Overview only): Role of Mechanical Engineering in Industries and Society.

Introduction to Mechanical Properties of Materials: Types of materials (ferrous and non-ferrous materials), Study of behavior of metals: stress, strain, yield strength, ultimate strength, toughness, ductility, elastic and plastic deformation, impact strength and hardness.

Machine Tool Operations: (No sketches of machine tools, sketches to be used only for explaining the operations).

Lathe: Principle of working of a center lathe, Lathe operations: Turning, facing and Taper turning by swiveling the compound rest.

Drilling Machine: Principle of working of simple drilling machine, Drilling operations: drilling, boring, reaming and tapping.

Computer Numerical Control: Introduction, Components of CNC, Advantages and Applications of CNC.

Joining Processes: Soldering, Brazing and Welding: Definitions, Classification and working principle.

UNIT-II

11 Hrs

Steam Formation and Application: Steam formation, Types of steam, Steam properties and Applications of steam (simple numerical problems).

Steam Turbines: Introduction, Classification and working principle of impulse and reaction turbines.

Water Turbines: Introduction to turbine, Classification of water turbine, principle and operation of Pelton and Francis turbine.

Energy Sources and Power Plants: Basic working principles of Hydel power plant, Thermal power plant, Nuclear power plant, Solar power plant and Wind power plant.

UNIT-III	11 Hrs
Introduction to IC Engines: Components and working principles of 4-Stroke Petrol and Diesel engines, Application of IC Engines, Fuel properties, Performance of IC engines (BP, IP, FP, Mechanical and Thermal efficiency) (Simple numerical problems). Introduction to Refrigeration and Air Conditioning: Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, Working principle of room air conditioner. Insight Into Future Mobility Technology: Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles.	
UNIT-IV	10 Hrs
Mechanical Power Transmission: Gear Drives: Types - spur, helical, bevel, worm and rack and pinion, Velocity ratio, Simple and Compound gear trains (simple numerical problems). Belt Drives: Introduction, Types of belt drives (Flat and V-Belt drive), Length of the belt and Tensions ratio (simple numerical problems). Introduction to Mechatronics and Robotics: Open-loop and closed-loop mechatronic systems. Robot anatomy, Joints & links, Industrial and non-industrial applications of robots.	
Text Books:	
1. K R Gopala Krishna, "Elements of Mechanical Engineering", Subhash Publications, 38th Edition, 2018. 2. Hazra Choudhry and Nirzar Roy, "Elements of Workshop Technology (Vol. 1 and 2)", Media Promoters and Publishers Pvt. Ltd, 17th edition, 2023.	
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1. https://www.vlcsolutions.com/blog/artificial-intelligence-in-manufacturing/ 2. https://www.neuralconcept.com/post/how-is-ai-used-in-mechanical-engineering 3. https://www.youtube.com/watch?v=MKiiXubKaGM 4. https://www.youtube.com/watch?v= canCYWZPsc 5. https://www.youtube.com/watch?v=lQ-MYnyxh7M	

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CO1	2 (WK1 and WK3)					1 (WK5)		1			1	1	
CO2	2 (WK1, WK2 and WK3)	1 (WK1, WK2, and WK3)						1			1	1	
CO3	2 (WK1 and WK3)				1 (WK6)			1			1	1	
CO4	2 (WK1, WK2 and WK3)	1 (WK1, WK2 and WK3)						1			1	1	

Course Code		:	1BMEM214L	Basic Mechanical Engineering Lab	Semester	:	02
L:T:P		:	0:0:2		Course Type	:	PSCL
Hours/Sem.	Teaching	:	00 Hrs		CIE Marks	50	50
	Practical	:	26 Hrs		SEE Marks	50	50
	Exam	:	04 Hrs		Total Marks	100	100
	Total Hrs.	:	30 Hrs		Credits	01	03

Professional Competency:

This course enables mechanical engineering students to safely and effectively perform basic manufacturing, testing, measurement, and CNC operations essential for engineering practice.

Course Outcomes:

After completion of the course, student will be able to:

- CO1: Perform basic machining and welding operations to produce components and assess dimensional accuracy.
- CO2: Determine the performance (power output and efficiency) of IC engine.
- CO3: Determine the properties and characteristics of fuels and oils..
- CO4: Calibrate various measuring devices to achieve accuracy of measurement.
- CO5: Determine the hardness of materials using hardness testing machine.

PART - A	13 Hrs
1. Performing facing, plain turning and counter sinking operations by using a lathe. 2. Performing drilling, reaming and tapping operations by using drilling machine. 3. Preparation of welded joints using the arc welding process. 4. Calibration of Vernier caliper and micrometer using slip gauges. 5. Determination of IP, BP, fuel consumption and mechanical efficiency using I. C. Engines. 6. Determination of the hardness of materials using Rockwell hardness testing machine.	
PART - B	13 Hrs
1. Comparative study of flash point and fire point of various fuels/oils using the open cup method. 2. Comparative study of flash point and fire point of various fuels/oils using the closed cup method. 3. Comparative study on viscosity of different base fuels using viscometer. 4. CNC Program for tool movement to carry machining on the job. 5. Determination of distillation characteristic of various fuel/oils using distillation apparatus.	

Text Books:

1. K R Gopala Krishna, "Elements of Mechanical Engineering", Subhash Publications, 38th Edition, 2018.
2. Hazra Choudhry and Nirzar Roy, "Elements of Workshop Technology (Vol. 1 and 2)", Media Promoters and Publishers Pvt. Ltd, 17th edition, 2023.

Reference Books:

1. Appu Kuttan KK, "Robotics", I K International Publishing House Pvt Ltd, 2013.
2. Jonathan Wickert and Kemper Lewis, "An Introduction to Mechanical Engineering", Global Engineering. 5th Edition, 2023.
3. Mikell P. Groover, "Automation, production systems and computer integrated manufacturing", Prentice Hall, 5th Edition, 2021.

4. P.N. Rao, "Manufacturing Technology- Foundry, Forming and Welding", Tata McGraw Hill 3rd Ed. 2003,

Web links and Video Lectures (e-Resources):

6. <https://www.vlcsolutions.com/blog/artificial-intelligence-in-manufacturing/>
7. <https://www.neuralconcept.com/post/how-is-ai-used-in-mechanical-engineering>
8. <https://www.youtube.com/watch?v=MKiiXubKaGM>
9. <https://www.youtube.com/watch?v= canCYWZPsc>
10. <https://www.youtube.com/watch?v=lQ-MYnyxh7M>

Table: Matrix to describe the mapping of COs with POs (considering Wks) and PSOs

Course Outcomes (COs)	Program Outcomes and (Wks)											Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO1	2 (WK1 and WK3,)					1 (WK5)		1			1	1	
CO2	2 (WK1, WK2 and WK3)					1 (WK5)		1			1	1	
CO3	2 (WK1, WK2 and WK3)					1 (WK5)		1			1	1	
CO4	2 (WK1, WK2 and WK3)							1			1	1	
CO5	2 (WK1 and WK3)							1			1	1	

Course Code :		1BMES103C/ 1BMES203C	Computer Aided Engineering Drawing for CSE Stream	Semester :	01 / 02
L:T:P :		2:0:3		Course Type :	ESC
Hours/Sem.	Teaching :	42 Hrs		CIE Marks :	50
	Learning (TW) :	42 Hrs		SEE Marks :	50
	Exam :	06 Hrs		Total Marks :	100
	Total Hrs. :	90 Hrs		Credits :	03

Professional Competency:

Prepare and communicate accurate engineering drawings of geometric entities, solids, and engineering components using manual drafting and Computer Aided Engineering Drawing (CAED) tools in compliance with engineering standards and industry requirements.

Course Outcomes:

After successful completion of the course, the student will be able to apply engineering drawing principles through manual drafting and computer-aided drafting (CAD) tools to:

CO1: Construct geometrical shapes and draw orthographic projections of points, lines and plane surfaces in different orientations with respect to the principal planes.

CO2: Draw orthographic projections of right regular solids in different orientations with respect to the principal planes.

CO3: Develop lateral surfaces of right regular solids, their truncated forms and orthographic to isometric projections of solids.

CO4: Create basic 2D/3D diagrams of networking, router and switches.

UNIT-I

25 Hrs.

Introduction

Introduction, Significance of engineering drawing, Different types of lines used in engineering drawing, Dimensioning: - elements and systems of dimensioning, Geometrical Constructions: -triangles and regular polygons, Orthographic Projections: - principal planes, principal views, four quadrants, systems of projection, symbol of projection. Introduction to Computer Aided Drafting software.

Orthographic Projections of Points, Lines and Planes

Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (placed in first quadrant only as per BIS). Orthographic projections of planes: triangular, square, rectangular, pentagonal, hexagonal and circular lamina (placed in first quadrant only using change of position method).

UNIT-II

15 Hrs.

Orthographic Projection of Solids

Orthographic projection of right regular solids (Resting on HP only and axis inclined to HP only); prisms, pyramids, cylinders and cones.

UNIT-III

24 Hrs.

Development of lateral surfaces of Solids:

Development of lateral surfaces of right regular prisms, pyramids, cylinders and cones with base on HP and their truncations (no problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

Isometric projections (Using Isometric Scale only)

Introduction, isometric scale, isometric projection of simple geometrical shapes, isometric projection of right regular prisms, pyramids, cylinders, cones, spheres, cut spheres, frustums and combination of two co-axial solids.

UNIT-IV	06 Hrs.
Computer Network Drawing (free hand sketch) 2D Network drawing: Network topology of wired and wireless networks. 3D drawing of router and switches.	
Text Books:	
1. K. R. Gopalakrishna and Sudhir Gopalakrishna, "A Textbook of Computer Aided Engineering Drawing", Subash Stores Bangalore, 39 th Edition, 2017. 2. N. D. Bhatt, "Engineering Drawing–Plane and Solid Geometry", Charotar Publishing House Pvt. Limited, 56 th Revised and Enlarged Edition, 2025.	
Reference Books:	
1. S. N. Lal and T. Madhusudhan, "Engineering Visualisation", Cengage Learning India Pvt. Ltd., 1 st Edition, 2022. 2. Prof. P. J. Shah, "Computer Aided Engineering Drawing", S. Chand Publishing, 2021. 3. M. B. Shah and B. C. Rana, "Engineering Drawing", Pearson Education, 2 nd Edition, 2009.	
Web links and Video Lectures (e-Resources):	
1. https://nptel.ac.in/courses/112104172 2. https://nptel.ac.in/courses/112102304 3. https://nptel.ac.in/courses/112105294 4. https://www.coursera.org/courses?query=3d%20modeling&utm 5. https://www.classcentral.com/subject/sheet-metal-design?utm	

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes (COs)	Program Outcomes and (WKs)											Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO1	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO2	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO3	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO4	2 (WK1 and WK3)	2 (WK1 and WK3)	-	-	1 (WK6)	-	1 (WK9)	1	-	-	1	2	-

Course Code :		1BMES103C/ 1BMES203C	Computer Aided Engineering Drawing for CV Stream	Semester :	01 / 02
L:T:P :		2:0:3		Course Type :	ESC
Hours/Sem.	Teaching :	42 Hrs		CIE Marks :	50
	Learning (TW) :	42 Hrs		SEE Marks :	50
	Exam :	06 Hrs		Total Marks :	100
	Total Hrs. :	90 Hrs		Credits :	03

Professional Competency:

Prepare and communicate accurate engineering drawings of geometric entities, solids, and engineering components using manual drafting and Computer Aided Engineering Drawing (CAED) tools in compliance with engineering standards and industry requirements.

Course Outcomes:

After successful completion of the course, the student will be able to apply engineering drawing principles through manual drafting and computer-aided drafting (CAD) tools to:

CO1: Construct geometrical shapes and draw orthographic projections of points, lines and plane surfaces in different orientations with respect to the principal planes.

CO2: Draw orthographic projections of right regular solids in different orientations with respect to the principal planes.

CO3: Develop lateral surfaces of right regular solids, their truncated forms and orthographic to isometric projections of solids.

CO4: Create basic 2D/3D diagrams of networking, router and switches.

UNIT-I

25 Hrs.

Introduction

Introduction, Significance of engineering drawing, Different types of lines used in engineering drawing, Dimensioning: - elements and systems of dimensioning, Geometrical Constructions: -triangles and regular polygons, Orthographic Projections: - principal planes, principal views, four quadrants, systems of projection, symbol of projection. Introduction to Computer Aided Drafting software.

Orthographic Projections of Points, Lines and Planes

Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (placed in first quadrant only as per BIS). Orthographic projections of planes: triangular, square, rectangular, pentagonal, hexagonal and circular lamina (placed in first quadrant only using change of position method).

UNIT-II

15 Hrs.

Orthographic Projection of Solids

Orthographic projection of right regular solids (Resting on HP only and axis inclined to HP only); prisms, pyramids, cylinders and cones.

UNIT-III

24 Hrs.

Development of lateral surfaces of Solids:

Development of lateral surfaces of right regular prisms, pyramids, cylinders and cones with base on HP and their truncations (no problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

Isometric projections (Using Isometric Scale only)

Introduction, isometric scale, isometric projection of simple geometrical shapes, isometric projection of right regular prisms, pyramids, cylinders, cones, spheres, cut spheres, frustums and combination of two co-axial solids.

UNIT-IV	06 Hrs.
Building Components Drafting (free hand sketch) Basic Building Components: foundations, columns, beams, slabs, walls, doors windows, staircase, assigning materials and rendering building components. Drafting a 2D floor plan for a simple single-storey residential/commercial building. .	
Text Books:	
1. K. R. Gopalakrishna and Sudhir Gopalakrishna, "A Textbook of Computer Aided Engineering Drawing", Subash Stores Bangalore, 39 th Edition, 2017. 2. N. D. Bhatt, "Engineering Drawing–Plane and Solid Geometry", Charotar Publishing House Pvt. Limited, 56 th Revised and Enlarged Edition, 2025.	
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CO2	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO3	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO4	2 (WK1 and WK3)	2 (WK1 and WK3)	-	-	1 (WK6)	-	1 (WK9)	1	-	-	1	2	-

Course Code :		1BMES103C/ 1BMES203C	Computer Aided Engineering Drawing for ECE Stream	Semester :	01 / 02
L:T:P :		2:0:3		Course Type :	ESC
Hours/Sem.	Teaching :	42 Hrs		CIE Marks :	50
	Learning (TW) :	42 Hrs		SEE Marks :	50
	Exam :	06 Hrs		Total Marks :	100
	Total Hrs. :	90 Hrs		Credits :	03

Professional Competency:

Prepare and communicate accurate engineering drawings of geometric entities, solids, and engineering components using manual drafting and Computer Aided Engineering Drawing (CAED) tools in compliance with engineering standards and industry requirements.

Course Outcomes:

After successful completion of the course, the student will be able to apply engineering drawing principles through manual drafting and computer-aided drafting (CAD) tools to:

CO1: Construct geometrical shapes and draw orthographic projections of points, lines and plane surfaces in different orientations with respect to the principal planes.

CO2: Draw orthographic projections of right regular solids in different orientations with respect to the principal planes.

CO3: Develop lateral surfaces of right regular solids, their truncated forms and orthographic to isometric projections of solids.

CO4: Create basic 2D/3D diagrams of networking, router and switches.

UNIT-I

25 Hrs.

Introduction

Introduction, Significance of engineering drawing, Different types of lines used in engineering drawing, Dimensioning: - elements and systems of dimensioning, Geometrical Constructions: -triangles and regular polygons, Orthographic Projections: - principal planes, principal views, four quadrants, systems of projection, symbol of projection. Introduction to Computer Aided Drafting software.

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UNIT-II

15 Hrs.

Orthographic Projection of Solids

Orthographic projection of right regular solids (Resting on HP only and axis inclined to HP only); prisms, pyramids, cylinders and cones.

UNIT-III

24 Hrs.

Development of lateral surfaces of Solids:

Development of lateral surfaces of right regular prisms, pyramids, cylinders and cones with base on HP and their truncations (no problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

Isometric projections (Using Isometric Scale only)

Introduction, isometric scale, isometric projection of simple geometrical shapes, isometric projection of right regular prisms, pyramids, cylinders, cones, spheres, cut spheres, frustums and combination of two co-axial solids.

UNIT-IV	06 Hrs.
Electronic Components Visualisation (free hand sketch) 2D/3D drawing: Optical fibre cable with core and cladding, photonic crystal fibers, Antenna: Single element patch antenna, antenna array. Sheet metal and surface design: PCB Enclosures.	
Text Books:	
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CO2	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO3	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO4	2 (WK1 and WK3)	2 (WK1 and WK3)	-	-	1 (WK6)	-	1 (WK9)	1	-	-	1	2	-

Course Code :		1BMES103C/ 1BMES203C	Computer Aided Engineering Drawing for EEE Stream	Semester :	01 / 02
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	Learning (TW) :	42 Hrs		SEE Marks :	50
	Exam :	06 Hrs		Total Marks :	100
	Total Hrs. :	90 Hrs		Credits :	03

Professional Competency:

Prepare and communicate accurate engineering drawings of geometric entities, solids, and engineering components using manual drafting and Computer Aided Engineering Drawing (CAED) tools in compliance with engineering standards and industry requirements.

Course Outcomes:

After successful completion of the course, the student will be able to apply engineering drawing principles through manual drafting and computer-aided drafting (CAD) tools to:

CO1: Construct geometrical shapes and draw orthographic projections of points, lines and plane surfaces in different orientations with respect to the principal planes.

CO2: Draw orthographic projections of right regular solids in different orientations with respect to the principal planes.

CO3: Develop lateral surfaces of right regular solids, their truncated forms and orthographic to isometric projections of solids.

CO4: Create basic 2D/3D diagrams of networking, router and switches.

UNIT-I

25 Hrs.

Introduction

Introduction, Significance of engineering drawing, Different types of lines used in engineering drawing, Dimensioning: - elements and systems of dimensioning, Geometrical Constructions: -triangles and regular polygons, Orthographic Projections: - principal planes, principal views, four quadrants, systems of projection, symbol of projection. Introduction to Computer Aided Drafting software.

Orthographic Projections of Points, Lines and Planes

Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (placed in first quadrant only as per BIS). Orthographic projections of planes: triangular, square, rectangular, pentagonal, hexagonal and circular lamina (placed in first quadrant only using change of position method).

UNIT-II

15 Hrs.

Orthographic Projection of Solids

Orthographic projection of right regular solids (Resting on HP only and axis inclined to HP only); prisms, pyramids, cylinders and cones.

UNIT-III

24 Hrs.

Development of lateral surfaces of Solids:

Development of lateral surfaces of right regular prisms, pyramids, cylinders and cones with base on HP and their truncations (no problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

Isometric projections (Using Isometric Scale only)

Introduction, isometric scale, isometric projection of simple geometrical shapes, isometric projection of right regular prisms, pyramids, cylinders, cones, spheres, cut spheres, frustums and combination of two co-axial solids.

UNIT-IV	06 Hrs.
Electrical Drawing (free hand sketch) 2D drawing of switches, sockets, panels, junction boxes and electric circuits. Schematic diagrams of automatic fire alarm, call bell system, UPS system, basic power system and residential layout.	
Text Books: 1. K. R. Gopalakrishna and Sudhir Gopalakrishna, "A Textbook of Computer Aided Engineering Drawing", Subash Stores Bangalore, 39th Edition, 2017. 2. N. D. Bhatt, "Engineering Drawing–Plane and Solid Geometry", Charotar Publishing House Pvt. Limited, 56th Revised and Enlarged Edition, 2025.	
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Web links and Video Lectures (e-Resources): 1. https://nptel.ac.in/courses/112104172 2. https://nptel.ac.in/courses/112102304 3. https://nptel.ac.in/courses/112105294 4. https://www.coursera.org/courses?query=3d%20modeling&utm 5. https://www.classcentral.com/subject/sheet-metal-design?utm	

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes (COs)	Program Outcomes and (WKs)											Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO1	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO2	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO3	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO4	2 (WK1 and WK3)	2 (WK1 and WK3)	-	-	1 (WK6)	-	1 (WK9)	1	-	-	1	2	-

Course Code :		1BMES103C/ 1BMES203C	Computer Aided Engineering Drawing for ME Stream	Semester :	01 / 02
L:T:P :		2:0:3		Course Type :	ESC
Hours/Sem.	Teaching :	42 Hrs		CIE Marks :	50
	Learning (TW) :	42 Hrs		SEE Marks :	50
	Exam :	06 Hrs		Total Marks :	100
	Total Hrs. :	90 Hrs		Credits :	03

Professional Competency:

Prepare and communicate accurate engineering drawings of geometric entities, solids, and engineering components using manual drafting and Computer Aided Engineering Drawing (CAED) tools in compliance with engineering standards and industry requirements.

Course Outcomes:

After successful completion of the course, the student will be able to apply engineering drawing principles through manual drafting and computer-aided drafting (CAD) tools to:

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UNIT-I

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UNIT-IV	06 Hrs.
Concept of Part Design (free hand sketch) 2D Examples: Simple and compound gear train, open and crossed belt drives and Hexagonal headed bolt and nut assembly. 3D Examples: Wind mill, Piston and connecting rod of an IC engine.	
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1. K. R. Gopalakrishna and Sudhir Gopalakrishna, "A Textbook of Computer Aided Engineering Drawing", Subash Stores Bangalore, 39 th Edition, 2017. 2. N. D. Bhatt, "Engineering Drawing–Plane and Solid Geometry", Charotar Publishing House Pvt. Limited, 56 th Revised and Enlarged Edition, 2025.	
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CO3	3 (WK1 and WK3)	2 (WK1 and WK3)	-	-	3 (WK6)	-	1 (WK9)	1	-	-	1	2	-
CO4	2 (WK1 and WK3)	2 (WK1 and WK3)	-	-	1 (WK6)	-	1 (WK9)	1	-	-	1	2	-