

GOVERNMENT COLLEGE OF ENGINEERING, JALGAON

Department of Mechanical Engineering

Scheme for Semester I B. Tech. (Mechanical Engineering) with effect from academic year 2023-24 (As per NEP 2020)

Course Code	Proposed Course Domain	Category	Teaching Scheme*				Evaluation Scheme					Credit	
			L	T	P	Total	Theory			Practical			Total
							MSE	ISA	ESE	ICA	ESE		
SH100AN	Induction Program [Includes Universal Human Values (UHV - I module)]	Mandatory audit course of three weeks duration as per AICTE model curriculum	...	...	...	...	...	...	50	...	50	AU	
SH101N	Engineering Mathematics I	BSC	3	1	...	4	30	10	60	...	...	100	4
SH102N	Engineering Chemistry	BSC	3	...	...	3	30	10	60	...	...	100	3
ME102N	Basic of Mechanical Engineering	ESC	3	...	...	3	30	10	60	...	...	100	3
CO101N	Fundamental of Computer Science and Engineering	ESC	3	...	...	3	30	10	60	...	...	100	3
SH100N	Ability Enhancement Course-I (English)	AEC-01	1	...	2	3	...	...	...	50	...	50	2
ME101N	Mechanical Workshop Practices	VSEC	...	...	4	4	...	...	...	50	...	50	2
SH103N	Engineering Chemistry Lab	BSC	...	...	2	2	...	...	...	50	...	50	1
ME103N	Basic of Mechanical Engineering Lab	ESC	...	...	2	2	...	...	...	50	...	50	1
CO102N	Fundamental of Computer Science and Engineering Lab	ESC	...	...	2	2	...	...	...	50	...	50	1
LL102N	Liberal Learning Course (Yoga and Nutrition)	LLC	2	...	...	2	...	...	..	50	...	50	2
Total			15	1	12	28	120	40	240	300	0	700	22

L : Lecture

ISA :Internal Sessional Assessment

P: Practical

ESE: End Semester Examination

MSE: Mid Semester Examination

ICA : Internal Contineous Accessment

ME101N –MECHANICAL WORKSHOP PRACTICES

Teaching Scheme : 04 P; Total: 04 hours/week

Credits : 02

Evaluation Scheme : 50 ICA

Total Marks :50

COURSE DESCRIPTION

The course intends to make students familiar with the basic manufacturing operations that are widely used in day to day life, such as Welding, Fitting, Plumbing, Molding and Smithy operations.

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Physics, chemistry and mathematics.

COURSE OUTCOMES:

On successful completion of this course, students shall be able to:

1. Understand the concept of welding and able to practice the operations in Arc welding.
2. Understand the concept of fitting, black smithy and able to practice the operations in fitting and black smithy.
3. Understand the concept of foundry and able to practice the operations in foundry.
4. Understand the concept of plumbing and able to practice the operations in plumbing.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSO_s (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2		3										1	2	2
CO2	2	1	1										1	2	1
CO3	1		2	2					1				2	2	2
CO4			1						2				2	1	1

Course Content

Students entering in workshop must perform following practical's

1) Welding Shop.

Concept of accidents causes of accidents, safety precautions while working in shop, safety equipment's and their use. One job on Arc welding-Lap/Butt/Tee Joint etc.

2) Fitting Shop.

Study of various tools like-files, drills, taps, dies and Fitting operations.

OnejobMale/Femalefittingwithoperations-Marking,cutting,drilling,tappingfilingetc

3) Black smithy.

Introduction to smithy operations like- bending, forming, upsetting, drawing.
Introduction to smithy tools, hammer, hot and cold chisel, flatters, tongs, anvil etc.
One job in smithy involving upsetting, drawing, bending such as hook, peg, square headed bolt etc.

4) Foundry Shop.

Principlesofmoulding,methods,coreandcoreboxes,preparationoffoundrysandfor casting.

5) Plumbing Shop.

Demonstration on plumbing tools, pipes, types of pipe joints, threading dies, Pipe fittings fitments, valves, etc.

Text Books:

1. M.S.Mahajan,ManufacturingEngineering,Firstedition,DhanpatRaiandsons, Delhi, 2008
2. Hajara Chaudhary and Bose SK, Element of Workshop Technology,2nd Edition.

ReferenceBooks

1. P N Rao, Production Technology, Volume I and II”, Tata McGraw Hill Publication, New Delhi, 2001.
2. PCSharma,ProductionTechnology,KhannaPublications,2014
3. R K Jain, Production Technology, Khanna Publication, 2014.
4. W.A.J.Chapman,WorkshopTechnology,ELBSLowPriceText,EdwardDonald Publications. Ltd.
5. Chapman WAJ, ProductionTechnology,HMTTataMcGrawHillPublication,2001.
6. Kannaiah KL, Narayana, Workshop Manual Chennai, second Edition Scitech Publications, 1998.

ME102N BASIC MECHANICAL ENGINEERING

Teaching Scheme : 03 L + 00 T; Total: 03 hours/week
Evaluation Scheme : 10 ISA + 30 MSE + 60 ESE
ESE Duration : 3 Hrs.

Credits : 03
Total Marks : 100

COURSE DESCRIPTION

This course introduces to analyze and design concepts of mechanical systems. This course includes basic elements of mechanical systems like clutch, couplings, gears, boilers, air compressors.

DESIRABLE AWARENESS / SKILLS

Knowledge of Physics.

COURSE OUTCOMES

On the successful completion of this course; student shall be able to -

1. Understand energy transfer in mechanical systems.
2. Identify the type of boiler.
3. Distinguish IC engines.
4. Estimate the performance of transmission system.
5. Enumerate the mechanical properties of material.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	1				1						1	1	2
2	1	1	1		1								2	2	2
3	2	3	2		2		2						2	2	2
4	3	3	3		3		2						1	1	2
5	1	3	2	1	1		1						1	1	2

1-Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

COURSE CONTENT

Unit 1

Energy: Introduction and applications of Energy sources- Fossil fuels, Nuclear fuels, Hydro, Solar, Wind, and Bio-fuels, Environmental issues-Global warming and Ozone depletion.

Heat Engines: Heat engine cycle, working substances, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles.[Simple Numerical Treatment]

Unit 2

Steam Boilers: Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox boiler, functioning of different mountings and accessories.

Internal Combustion Engines: Introduction, Classification, Engine details, four-stroke, two-stroke engines.

Air Compressors:Types and operation of Reciprocating and Rotary air compressors, significance of multistage compression.

Unit 3

Couplings, Clutches and Brakes: Construction and applications of Couplings (Box; Flange; Pin type flexible; Universal and Oldham), Clutches (Disc and Centrifugal), and Brakes (Block; Shoe; Band and Disc).[No Numerical Treatment]

Unit 4

Transmission of Motion and Power: Shaft and axle, Different arrangement and applications of Belt drive; Chain drive; Friction drive and Gear drive.[No Numerical Treatment]

Unit 5

Engineering Materials: Types, properties and applications of Ferrous & Nonferrous metals, Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer.

Reference Books :

1. Elements of Mechanical Engineering by N M Bhatt and J R Mehta, Mahajan Publishing House .
2. Basic Mechanical Engineering by Pravin Kumar, Pearson Education .
3. Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publication New Delhi.
4. Elements of Mechanical Engineering by Sadhu Singh, S. Chand Publication.

5. Introduction to Engineering Materials by B.K. Agrawal, McGraw Hill Publication, New Delhi.

ME103N BASIC MECHANICAL ENGINEERING LAB

Teaching Scheme : 02 P; Total: 02 hours/week
Evaluation Scheme :50 ICA

Credits : 01
Total Marks : 50

COURSE DESCRIPTION

This course deal with the practical exposure to verification of basic mechanical systems.

DESIRABLE AWARENESS / SKILLS

Concepts and theory of the course ME101N BASIC MECHANICAL ENGINEERING

COURSE OUTCOMES

On the successful completion of this course; student shall be able to

- 1 Analyze working of boilers
- 2 Demonstrate function of boiler mountings and accessories.
- 3 Understand the working of gear trains.
- 4 Examine the transmission system.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1				2						1	1	1
2	2	1	2		1		1						1	1	1
3	1	3	1		1		2						1	1	1
4	2	2	2		1		2						1	1	

1-Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

COURSE CONTENT

Minimum eight experiments shall be performed to cover entire curriculum of course ME101N Basic Mechanical Engineering

List of Experiments

- To understand construction and working of various types of Fire tube boilers.
- To understand construction and working of various types of Water tube boilers.
- To understand construction and working of various types of boiler mountings.
- To understand construction and working of various types of boiler accessories.
- To understand construction features of two stroke and four stoke engines.

- To understand construction and working of different types of air compressors.
- To understand construction, working of clutches, coupling and brakes.
- To understand different arrangement and application of various power transmission drives
- Study and demonstration of various types of pumps.
- Study and demonstration of Domestic refrigerator.

Evaluation Methodology:

- **ICA** – It shall support for regular performance of practical and its regular assessment. In addition; it shall be based on knowledge/skill acquired and record submitted by student (journal) based on practical performed by him/her. The performance shall be assessed experiment wise using the prescribed internal continuous assessment format.
 - **ESE** – It shall be based on performance in one of the experiments performed by student in the semester followed by sample questions to judge the depth of understanding/knowledge or skill acquired by the student. It shall be evaluated by two examiners, out of which one examiner shall be external examiner.
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GOVERNMENT COLLEGE OF ENGINEERING, JALGAON

Department of Mechanical Engineering

Scheme for Semester II B. Tech. (Mechanical Engineering) with effect from academic year 2023-24 (As per NEP 2020)

Course Code	Proposed Course Domain	Category	Teaching Scheme*				Evaluation Scheme					Credit	
							Theory			Practical			Total
			L	T	P	Total	MSE	ISA	ESE	ICA	ESE		
SH151N	Engineering Mathematics II	BSC	3	1	...	4	30	10	60	...	...	100	4
SH152N	Engineering Physics	BSC	3	...	...	3	30	10	60	...	...	100	3
ME151N	Engineering Graphics	ESC	3	...	...	3	30	10	60	...	...	100	3
ME155N	Mechanics for Mechanical Engineering	ESC	2			2	30	10	60	...	...	100	2
ME152N	Engineering Exploration Workhop	VSEC	...	...	4	4	...	...	...	50	...	50	2
ME154N	Manufacturing Process	PCC	2	...	...	2	30	10	60		...	100	2
SH153N	Engineering Physics Lab	BSC	...	...	2	2	...	...	...	50	...	50	1
ME153N	Engineering Graphics Lab	ESC	...	...	2	2	...	...	...	50	...	50	1
IK103N	Essence of Indian Traditional Knowledge	IKS	2	...	...	2	...	...	60	...	...	60	2
LL101N	Liberal Learning Course (NSS and Sports)	LLC	2	...	...	2	...	...	...	50	...	50	2
Total			17	1	8	26	150	50	360	200	0	760	22

Students exiting the First Year programme after securing minimum 40 credits will be awarded UG Certificate in the relevant Discipline /Subject provided they secure 8 credits in work-based vocational courses or internship / Apprenticeship offered during summer vacation in addition to 4 credits from skill-based courses earned during the first and second semester

ME151 N- ENGINEERING GRAPHICS

Teaching Scheme: 03L +00T, Total: 03

Credit : 03

Evaluation Scheme: 30 MSE+10 ISA+ 60 ESE

Total marks : 100

Duration of ESE: 04 Hrs.

COURSE DESCRIPTION:

Engineering Graphics is a basic course for all undergraduate Engineering program. This course provides the elementary level knowledge of technical Geometry that is engineering drawing. This course is therefore introduced to provide the basic understanding of the fundamentals of Engineering Drawing, mainly visualization, graphics theory, standards and conventions of drawing, the tools of drawing and the use of Drawings in engineering applications. Course includes in briefs that introduction to Engineering Drawing, Orthographic Projection, Isometric view and Isometric Projection, line planes, solids and Development of solids

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Geometry, mechanics

COURSE OUTCOMES:

Students will be able to -

1. Understand the concept of Projection of lines, Planes and able to draw basic views of projection of lines and Planes.
2. Understand the concept of conversion of Pictorial view into orthographic view and able to draw orthographic view.
3. Understand the concept of conversion of Orthographic view into Isometric view/Pictorial View and able to draw isometric view.
4. Understand the concept of calculating external surface area of given object and able to draw the external surface.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	-	-	-	2	-	-	-	-	3	-	2	3	2	1
2	1	-	1	2	2	-	-	-	1	3	-	1	3	1	1
3	1	2	1	1	2	-	-	-	-	3	-	-	3	1	1
4	1	-	3	-	2	-	-	-	-	3	-	2	3	1	1

1-Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

COURSE CONTENT

Projections of Lines:

Projections of Straight Lines: Introduction and concept projection of line, line position & its exercises on following cases as: - line parallel to both the reference planes, line parallel to one reference plane and perpendicular to the other, line inclined to one reference plane and parallel to the other, line inclined to both the reference planes. Applications based exercise on line inclined to both reference planes based on HP & VP only. (Note: - *Exercises on Traces of line are excluded*).

Projections of Planes:

Projections of planes: Introduction and concept of shapes or forms of various types Plane, Position of plane with respective reference plane cases concepts and exercises based on following cases as: plane surface parallel to one reference plane and perpendicular to other reference plane, plane surface inclined to one reference plane and perpendicular to other reference plane, planes inclined to both reference planes (Oblique planes).(Exercises shall be based and exercised on all above cases as well as suspended planes & Composite planes applications).

Note: - *all exercises will be solving by any **one** of method chose among of two kinds which are as either by 'change of position method' or 'Auxiliary Plane method'.*

Orthographic Projections:

Principle of orthographic projections Methods (First and third angle orthographic projection methods) Exercises shall be consist of orthographic projection methods of different machine / mechanical components; problem shall be based on first and third angle Orthographic. Projection Methods only, Concept of sectional orthographic projections method (First and third angle orthographic projection methods). Types of Sectional view; Sectional orthographic projections (view) problem shall be exercised only on object sectioned (cut) only by single cutting plane.

Note: - following part are excluded from TH –ESE and ICA. *Following Prerequisite part of ME151R & ME153R EG LAB is necessiate to obeying Standards of drawing as: - Lettering -single stroke and double stroke gothic lettering, Types of lines, Dimensioning: methods of dimensioning and types of dimensioning, scaling. All these topics of standards shall be cover in practical session of ME153R EGD lab.*

Isometric view:

Isometric Views: Introduction to pictorial views, isometric scale, isometric projections and its classification, exercises consist of problems on simple and complex mechanical objects shall be solve on Isometric view and isometric projection methods.

Projection of Development of Lateral surfaces:

Introduction, Concept and significance of Development of surfaces and lateral surfaces, Development of lateral surfaces of all types of regular solids such as prisms, pyramids, cones and cylinders Cases shall be exercised as: - solid surface/s are cut by following means such as single cutting plane line (C-P line), two parallel C-P lines, Two Non-parallel C-P lines, Two Intersecting CP lines and Underneath cuts of any shape on surfaces of solids (parallel and radial method only).

Introduction to CAD tool:

Introduction to 2D CAD software, Advantages of CAD packages, applications of CAD, essential configuration, basic operation of drafting packages, Understand Basic Use of Various menus commands in CAD tool.

(Note: - *The CAD based questions shall be excluded from theory - MSE & ESE. The teaching part of same shall be conduct concurrently in the laboratory practical hours with practice of different exercises.*).

Text Books:

- 1) Engineering Drawing, Bhatt N. D., Panchal V. M., 2008 onwards Charotar Publication, Anand, India.
- 2) Engineering Drawing and Graphics, K. Venugopal, 3rd edition, New Age International, 1998.
- 3) Publishers, New Delhi, 2007.
- 4) A Text book of Engineering Drawing, P.J. Shah, S. Chand & company Ltd., New Delhi. 2009.
- 5) A First Course in Engineering Drawing, Rathnam, K., (2018), Springer Nature Singapore Pte. Ltd., Singapore.

Reference Books:

- 1) Engineering Drawing and design, Madsen, D. P. and Madsen, (2016), D. A Delmar Publishers Inc., USA.
- 2) A Textbook of Engineering Drawing, Dhawan, R. K., (2000), S. Chand, New Delhi.
- 3) Fundamentals of Engineering Drawing, W J Luzadder and J M Duff, Fundamentals of Engineering Drawing, 11th edition, Prentice-Hall of India, 1995 Giesecke, F. E., Mitchell, A., Spencer, H. C., Hill, I. L., Loving, R. O., Dygon, J. T., (1990), "Principles of engineering graphics, McMillan Publishing, USA
- 4) Engineering Drawing and Design", Jensen, C., Helsel, J. D., Short, D. R., (2008), McGraw-Hill International, Singapore.
- 5) Graphic Science and Design, T. E. French, C. J. Vierck and R J Foster, 4th edition, McGraw Hill, 1984.
- 6) Engineering Graphics, Vol.-I and Vol.-II, Dhabhade M. L., Vision Publications 2003 onwards
- 7) Engineering drawing – P.S Gill, S. K. Kataria publication. 2012 onwards.
- 8) Engineering Graphics with AutoCAD, Kulkarni, D. M., Rastogi, A. P. and Sarkar, A. K PHI, India, 2009.

ME152N-ENGINEERING EXPLORATION WORKSHOP

Teaching Scheme : 04 P; Total: 04 hours/week

Credits : 02

Evaluation Scheme : 50 ICA

Total Marks :50

COURSE DESCRIPTION

The course intends to make students familiar with the basic Workshop operations that are widely used in day to day life, such as Carpentry, Sheet Metal. Further it intends to offer fundamental knowledge of equipment used in Electrical workshop. It also covers most of the widely used Computer peripherals and their operations and fundamental equipment used by a Civil engineer.

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Physics, Mathematics, Electrical and Computer sciences.

COURSE OUTCOMES:

On successful completion of this course students shall be able to:

- 1) Understand the concept of carpentry, sheet metal and practice hands-on operations on it.
- 2) Understand the concept of basic electrical appliances and practice hands-on exercise on it.
- 3) Understand the concept of basic computer devices and practice hands-on exercise on it.
- 4) Understand the concept of basic electronics component and practice hands on exercise on it.
- 5) Understand the concept of basic civil measuring instruments and practice hands on exercise on it.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs

(WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1			2										1	2	2
CO2			2										1	2	1
CO3				1									2	2	2
CO4	1				2								2	1	1
CO5	1	2	2										2	2	1

Course Content

Students entering in workshop must perform following practical's

1) Carpentry Shop.

Introduction to wood working, kinds of woods, hand tools and machines, Types of joints, wood turning, to instruments like Steel rule, Callipers, Vernier Calliper, Micrometre. One job involving joint and wood turning.

2) Sheet Metal Shop.

Introduction to primary technology processes involving bending, punching and drawing various sheet metal joints, development of joints. One job on commercial items such as Dustbin, funnel, tray etc.

3) Electrical Workshop.

Minimum **four** experiments shall be performed from the list of experiments provided below.

1. Identify different types of cables/wires, switches, fuses and fuse carriers, MCB and ELCB, MCCB with ratings and usage. 2. Measurement of voltage, current and power in single phase circuit using voltmeter, ammeter and wattmeter. 3. Wiring of backup power supply including inverter, battery and load for domestic installations. 4. Demonstration and measurement of power consumption of electric iron, mixer grinder, single phase pump, exhaust fan etc. 5. Installation and maintenance of domestic solar appliances. 6. Demonstration on preparation of extension boards. 7. Study of On-OFF control of electrical lighting and fans operated by remote.

4) Computer Workshop.

Introduction and identification of hardware components of a typical computer system. Assembling and Disassembling the PC. Handling and operating peripheral devices like printer, scanner, pen drives, CD-ROM, Multimedia Devices, UPS etc.

5) Electronics Workshop.

Demonstration and use of electrical and electronics hand and power tools. Measurement of resistance, capacitance, voltage and frequency. Assembly of electronic components on the printed circuit board (PCB)/Bread Board.

6) Civil Workshop.

Study and use of Chain and tape, Levelling staff and Dumpy level, Planimeter and Measurement of height of building.

Text Books

1. M.S. Mahajan, Metrology and Quality Control, Dhanpat Rai and Sons, Delhi. 2008 onwards.
2. Hajara Chaudhary, Bose SK, Elements of Workshop Technology, Volume I and II, Asia

Publishing House. 1997 onwards.

3. B.L. Theraja, Fundamentals of Electrical Engineering, 27th Publishers, 1996.

Reference Books

- 1 Chapman W. A. J., Workshop Technology, CBS Publication. 1986 onwards.
- 2 T. P. Kanetkar and S. V. Kulkarni, Surveying and leveling Part 1, Pune Vidarthigriha Prakashan, 2010
- 3 Leonard S. Bobrow, Fundamentals of Electrical Engineering, 2nd Edition, Oxford Press, 1998.

ME153 N- ENGINEERING GRAPHICS LAB

Teaching Scheme: 01PR, Total: 01
Evaluation Scheme: 50 ICA

Credit: 01
Total Marks: 50

COURSE DESCRIPTION:

Engineering Graphics Lab is a basic course for all undergraduate Engineering program. This course provides the elementary level knowledge of technical Geometry that is engineering drawing. This course is therefore introduced to provide the basic understanding of the fundamentals of Engineering Drawing, mainly visualization, graphics theory, standards and conventions of drawing, the tools of drawing and the use of Drawings in engineering applications. Course includes in briefs that introduction to Engineering Drawing, Orthographic Projection, Isometric view and Isometric Projection, line planes, solids and Development of solids by plotting on sheets manually and computerized.

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Geometry, elements of Mechanical, Civil and Electrical Engineering.

COURSE OUTCOMES:

Students will be able to –

1. Understand the concept of Projection of lines , Planes and able to draw basic views of projection of lines and Planes.
2. Understand the concept of conversion of Pictorial view into orthographic view and able to draw orthographic view.
3. Understand the concept of conversion of Orthographic view into Isometric view/Pictorial View and able to draw isometric view.
4. Understand the concept of calculating external surface area of given object and able to draw the external surface .

RELEVANCE OF COURSE OUTCOMES (CO_s) WITH PO_s AND PSO_s (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	-	-	-	2	-	-	-	-	3	-	2	3	2	1
2	1	-	1	2	2	-	-	-	1	3	-	1	3	1	1
3	1	2	1	1	2	-	-	-	-	3	-	-	3	1	1
4	1	-	3	-	2	-	-	-	-	3	-	2	3	1	1

1-Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

CONTENT:

Internal continuous assessment (ICA) shall be on performances of sheets drawn and based on syllabus of course ME 151R EG.

All **five** sheets are mandatory. Each sheet shall be based and drawn as per below;

*Plot the following sheets on full trimmed sheet (hand sketched sheets),
Sheets shall be based on –*

1. The orthographic projections and sectional view – problems shall be exercised in the sheet on five mechanical objects.
2. The Isometric View and isometric projections - – problems shall be exercised in the sheet on four 2d drawings.
3. The projections of lines – problems shall be exercised in the sheet on two on simple cases and rest four on line inclined to both reference planes.
4. The projections of plane – problems shall be exercised in the sheet on plane inclined to both reference planes.
5. Development of surfaces – four problems shall be exercised on the lateral Development of surfaces of different regular solid (out of four two shall be on parallel line method and rest two shall be based on radial line method only).

Note:-

- Standard sizes of trimmed and untrimmed sheet shall be as per BIS standards SP: 46 (2003).

Guide lines for ICA:

Internal Continuous Assessment should support for regular performance of practical/sheets and its regular assessment with proper understanding principles of practical/ sheets completed.

Text books:

1. A text book of Engineering Graphics with an Introduction to Computer Aided Drafting (Vol. I) by Phakatkar. H. G, 7th edition, Nirali Prakashan, Pune 1997.
2. A text book of Machine Drawing and Computer Graphics by Farazdak Haideri, Nirali Prakashan, Pune, 1998.

Reference Books:

1. Engineering Drawing, N. D. Bhatt and V.M. Panchal, Charoter Publications.
2. Fundamental of Engineering Drawing and computer Graphics, Haravinder Singh, 3rd edition, Dhanpat Rai Publication Co, New Delhi, India.
3. Engineering Graphics with AutoCAD, Kulkarni, D. M., Rastogi, A. P. and Sarkar, A. K PHI, India, 2009.

ME154N-MANUFACTURING PROCESSES

Teaching Scheme : 02L + 00 T; Total: 02 hours/week

Credits : 02

Evaluation Scheme : 10 ISA + 30 MSE + 60 ESE

Total Marks : 100

ESE Duration : 3 Hrs.

COURSE DESCRIPTION

This course provides the basic knowledge of manufacturing processes, fundamentals of casting processes, metal forming and forging processes, welding and joining processes, metal removing processes.

DESIRABLE AWARENESS / SKILLS

Knowledge of basic manufacturing processes and their concepts

COURSE OUTCOMES

On the successful completion of this course; student shall be able to -

1. Know the patterns and casting for various mechanical engineering applications.
2. Compare different metal forming process for particular application.
3. Use proper joining processes for particular application.
4. Explain metal removing process for particular application.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3					1							1		1
2	1	1			1	1							1		
3	1				1	1							1		1
4	3				1								1		

1-Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

COURSE CONTENT

- 1) **Introduction Manufacturing** – definition, classification of manufacturing processes.
Sand Casting and Special Casting Methods- Basic principle and terminology of sand casting, types of casting pattern, types of patterns, pattern materials, various allowances in pattern making, core print, core boxes, gating system, types of gate, directional and progressive solidification, general properties of molding sand, sand molding defects, permanent mould casting, slush casting, shell molding, investment or lost wax casting, vacuum process, centrifugal casting, die casting.(No numerical treatment)

- 2) **Metal Forming Processes-** Rollin process, classification of rolling, hot and cold working processes, Forging: forging process, forging operations, open die and close die forging, hammer forging, impression die, press forging, upset forging, roll forging, extrusion methods, extrusion of hollow shape, hydrostatic extrusion, continuous extrusion, wire, and rod drawing.
- 3) **Metal Joining Processes-** Introduction to riveting, soldering, brazing and welding ,classification, gas welding, working principle and its application, arc welding: types and purpose of electrodes, Tungsten Inert Gas (TIG) welding: working principle and its application, Metal Inert Gas (MIG) welding: working principle and its application, submerge arc welding,(SAW), resistance welding: working principle and its applications, other welding processes: electron beam, laser welding.
- 4) **Metal Removing Processes-** Introduction to machine tool, lathe machine: - principal parts of lathe machines lathe specification. lathe machine operations: facing, turning, boring, parting, drilling, reaming, knurling, milling machine: principle of milling, up milling and down milling, types of milling cutters, drilling machine: operations, drilling, boring, reaming, spot facing, counter boring, counter sinking, tapping, grinding Process: grinding machine, types of grinding wheels.

Text Books:

1. Industrial engineering and Production Management , M.S. Mahajan, 1 st edition, Dhanpat Rai and sons, Delhi, 2014.
2. Production Technology, P C Sharma, 8th revised edition edition, Khanna Publications, New Delhi. 1999.
3. Element of Workshop Technology, Volume I and II ,Hajara Chaudhary and Bose S K, 2nd edition, Asia Publishing House, Bombay,1999.
4. Manufacturing Processes for Engineering Materials, Steven R. Schmid, Serope Kalpakjian, 5th edition, Pearson Publication, 2009.

Reference Books:

1. Materials and Processes in Manufacturing, DeGarmo, Black Konser, 11th edition, Wiley, 2011.
2. Introduction to Manufacturing Processes, Schey J. A., 3rd edition, Tata McGraw Hill, 1999.

3. Processes and Materials of Manufacturing, Lindberg A., 4th edition, Prentice Hall, 1998.
4. Workshop Technology, Vol. I Raghuvanshi B.S.10 th edition, Dhanpat Rai and sons, Delhi, 2013.
5. Elements of Workshop Technology, Vol. I Hazra Choudhary, 2 nd edition 2009, Media Promoters
6. Production Technology, Jain R.K., 17th edition, Khanna publication, 2014.
7. HMT Production Technology, Handbook, Tata McGraw Hill Publishing Co.1998

ME155N Mechanics for Mechanical Engineering.

Teaching Scheme : 02 L; Total: 02 hours/week

Credits : 02

Evaluation Scheme : 10 ISA + 30 MSE + 60 ESE.

Total Marks : 100

ESE Duration : 3 Hrs.

COURSE DESCRIPTION

This course provides the elementary level knowledge of Engineering and Engineering mechanics which includes study of forces and force systems, Resultant and equilibrium of coplanar force systems, Simple machines and SFD/ BMD

DESIRABLE AWARENESS / SKILLS

Knowledge of Mathematics, Physics and Basics of Science.

COURSE OUTCOMES

On the successful completion of this course; student shall be able to -

1. apply concept of engineering mechanics with various theorems and its applications.
2. apply the approaches of equilibrium, beam of different supports and loadings.
3. find out centroid, moment of inertia of various regular and composite planes of bodies.
4. apply the principle of linear motion and momentum principle.
5. estimate shear force and bending moment diagram for simple beam and loadings.

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2		1			1					1	1		1
2		1	3	1	1								1	1	1
3	3	2	1	1									1		1
4	2	3	2	1		1							1		1
5	2	2	3	2			1						1	1	1

1-Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

COURSE CONTENT

Introduction to Engineering Mechanics: Basic concept, Principles of Mechanics, Force types and Force System, composition and Resolution of forces, Resolution of Concurrent force System in Plane, Moment of forces/ Couple, Varignon's theorem, Equivalent Force system, Resultant of Non-Concurrent Force System in plane, Introduction to Space forces, Resultant of Concurrent Forces system in Space.(Numerical treatment)

Equilibrium of Force System: Particle equilibrium in 2d/3d, rigid body equilibrium, type of supports and Loads, Free body diagram, Conditions and equations of equilibrium, Equilibrium of forces in Plane, Equilibrium of concurrent force system in space, Lami's theorem, Reactions of determinate beams. .(Numerical treatment)

Center of Gravity: Introduction, center of Gravity / centroid of simple figures / composite sections, centre of gravity and its implications. . (Numerical treatment)

Moment of Inertia: Introduction, definition, moment of inertia of plane sections / standard sections / composite sections, theorem of moment of Inertia, mass moment of inertia of circular plate, cylinder, cone, sphere and hook. (simple numerical treatment)

Internal Forces: Internal forces in simply supported and cantilever member for point load and UDL, Determination of variation of axial force (Axial force diagram), Shear force (Shear force diagram), Bending moment (Bending moment diagram) and twisting moment. .(Numerical treatment)

Simple Machines: Introduction simple machine, compound machine, simple gear drive, simple gear train, velocity ratio of a simple gear train, velocity ratio, compound gear train, terminology in simple lifting machine- (M.A, V.R. & Efficiency and relation between them), law of machine, maximum mechanical advantage (max. M.A.), maximum efficiency.

Text Books

1. Bhavikatti S.S, Engineering Mechanics, New Age International Publications, 4th edition, 2013.
2. F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers Vol I-Statics, Vol. Dynamics, Tata McGraw Hill 9th Ed, 2011.
3. Stephen Timoshenko, Strength of Materials Part -1, CBS Publishers and Distributors, New Delhi, 2000.
4. Singer F.L. and Andrew Pytel, Strength of Material, Harper and Row Publishers, New York.
5. R. K. Bansal, A Text Book of Engineering Mechanics, Laxmi Publication New Delhi, 6th edition, 2013

Reference Books

1. Irving H. Shames, Engineering Mechanics, Prentice Hall, 4th Edition, 2006.
2. R.C.Hibbler, Engineering Mechanics, Pearson Press, 4th edition, 2006.
3. Andy Ruina and Rudra Pratap, Introduction to Statics and Dynamics, Oxford University Press, 2011,
4. Hibler and Gupta, Engineering Mechanics , Pearson Education 11th edition, 2010.
5. Reddy Vijaykumar K. and K. Suresh Kumar, Engineering Mechanics, Singer's, 3rd edition 2011.
6. Ramamrutham, A Text Book of Engineering Mechanics, Dhanpatrai Publications, 8th edition, 2008.