DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.SU/Engg./S.Y.B.Tech./02/2017

It is hereby informed to all concerned that, the syllabi prepared by the Committees & recommended by the Dean, Faulty of Science & Technology, the **Academic Council at its meeting held on 20 & 21 June 2017 has accepted the following syllabi in accordance with Choice Based Credits & Grading System for all Branches S.Y.B.Tech** under the Faulty of Science & Technology as enclosed herewith.

Sr.No.	Syllabi as per CBC & GS
[1]	Second Year B.Tech.[Civil Engineering],
[2]	Second Year B.Tech. [Mechanical Engineering],
[3]	Second Year B.Tech. [Agricultural Engineering],
[4]	Second Year B.Tech.[Electrical Engineering],
[5]	Second Year B.Tech. [Plastic & Polymer Engineering],
[6]	Second Year B.Tech [Electronics & Telecommunication Engg.],
[7]	Second Year B.Tech. [Computer Science Engineering].

This is effective from the Academic Year 2017-2018 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. SU/S.Y.B.TECH.2017/2173-84

Date:- 28-06-2017.

**Deputy Registrar,
Syllabus Section.**

Copy forwarded with compliments to :-
1] **The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.**
2] The Director, University Network & Information Centre, UNIC, with **a request to upload this Circular on University Website.**
Copy to :-
1] The Director, Board of Examinations & Evaluation,
2] **The Section Officer,[Engineering Unit] Examination Branch,**
3] The Section officer, [Eligibility Unit],
4] **The Programmer [Computer Unit-1] Examinations,**
5] **The Programmer [Computer Unit-2] Examinations,**
6] The In-charge, [E-Suvidha Kendra],
7] The Public Relation Officer,
8] The Record Keeper,

SCHEME AND DETAILED SYLLABUS

of

S. Y. B. Tech. (Mechanical Engineering)

Under Choice Based Credit & Grading System

(w.e.f. academic year 2017-18 & onwards/-)

FOUR YEAR DEGREE COURSE IN SCIENCE & TECHNOLOGY

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

FACULTY OF SCIENCE AND TECHNOLOGY
Revised Structure w.e.f. 2017-2018
Second Year B. Tech. (Mechanical Engineering)

| Course Code | Semester III | | | | | | | | | | | | Duration |
	Course	L	T	P	Total	CT	TH	TA	P	Total	Credits		of Theory Exam
			Contact Hrs / Week				**Examination Scheme**						
BSH201	Engineering Mathematics – III	3	1	-	4	20	80	-	-	100	4		3 Hrs
MED202	Strength of Materials	3	1	-	4	20	80	-	-	100	4		3 Hrs
MED203	Fluid Mechanics	4	-	-	4	20	80	-	-	100	4		3 Hrs
MED204	Manufacturing Process – I	4	-	-	4	20	80	-	-	100	4		3 Hrs
MED205	Metrology & Quality Control	4	-	-	4	20	80	-	-	100	4		3 Hrs
MED206	Engineering Thermodynamics	2	-	-	2	10	40	-	-	50	2		2 Hrs
MED221	Lab: Fluid Mechanics	-	-	2	2	-	-	25	25	50	1		-
MED222	Lab: Strength of Materials	-	-	2	2	-	-	50	-	50	1		-
MED223	Lab: Metrology & Quality Control	-	-	2	2	-	-	25	25	50	1		-
MED224	Workshop Practise – II			2	2			25	25	50	1		-
BSH225	Lab: DOS – II	-	-	2	2	-	-	50	-	50	1		-
Total of Semester – III		20	2	10	32	110	440	175	75	800	27		-

| Course Code | Semester III | | | | | | | | | | | | Duration |
	Course	L	T	P	Total	CT	TH	TA	P	Total	Credits		of Theory Exam
			Contact Hrs / Week				**Examination Scheme**						
BSH251	Engineering Mathematics – IV	3	1	-	4	20	80	-	-	100	4		3 Hrs
MED252	Machine Drawing	4	-	-	4	20	80	-	-	100	4		4 Hrs
MED253	Manufacturing Process – II	4	-	-	4	20	80	-	-	100	4		3 Hrs
MED254	Applied Thermodynamics	3	1	-	4	20	80	-	-	100	4		3 Hrs
MED291-293	Elective – I *	4	-	-	4	20	80	-	-	100	4		3 Hrs
MED255	Electrical Technology	2	-	-	2	10	40	-	-	50	2		2 Hrs
MED271	Lab: Machine Drawing	-	-	2	2	-	-	25	25	50	1		-
MED272	Lab: Applied Thermodynamics	-	-	2	2	-	-	25	25	50	1		-
MED273	Lab: Workshop – III	-	-	2	2	-	-	25	25	50	1		-
MED274	Lab: Electrical Technology			2	2			50	-	50	1		-
MED275	Lab: DOS III	-	-	2	2	-	-	50	-	50	1		-
Total of Semester – IV		20	2	10	32	110	440	175	75	800	27		-
Grand Total of Semester III & IV						**220**	**880**	**350**	**150**	**1600**	**54**		

L: Lecture hours per week **T:** Tutorial hours per week **P:** Practical hours per week **CT:** Class Test **TH:** University Theory Examination **TW:** Term Work **P:** Practical/Oral Examination

* Elective I:
　　　MED291:Alternative Energy Sources
　　　MED292:Advanced Solid Mechanics
　　　MED293:Total Quality Management

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Engineering & Technology)	
Syllabus of S. Y. B. Tech. (All) Semester-III	
Course Code: BSH201	**Course: Engineering Mathematics –III**
Teaching Scheme: 04Hrs/week	**Class Test: 20marks**
Theory: 03Hrs/week	**Theory Examination (Duration): 03 Hrs**
Tutorial: 01Hr/week	**Theory Examination (Marks): 80**
Credits:04	

Objectives	**:**	1. The contents aims to develop and apply the knowledge of the student in the direction of solving the practical problem of differential equation in the engineering and technology. 2. To develop Logical understanding of statistics. 3. To study the basic of Laplace transform.
Unit-I	**:**	**Linear Differential Equation**: Solution of linear differential equation of order n with constant coefficients: The complementary function, Method of finding particular integral: Short method, General method, Method of variation of parameters. Equations reducible to linear equations with constant coefficients: i) The Cauchy's linear equation. ii) The Legendre's linear equation. **(10 Hrs)**
Unit-II		**Application of linear differential equations to:** i) Mechanical system. ii) Electrical System iii) Beam and Shafts **(04 Hrs)**
Unit-III	**:**	**Vector Differentiation:** Differentiation of vectors, Radial, Transverse, Normal and tangential components of velocity and acceleration, Scalar and vector point function, Gradient of scalar point function, Divergence and curl of vector point function, Second order differentiation operator, Irrotational and solenoid fields. **(10 Hrs)**

Unit-IV	:	**Laplace Transform:**
		Definition, Laplace Transform of elementary function and its table, Theorem and properties of Laplace Transform: First shifting theorem, Second Shifting Theorem, Multiplication by t, Division by t, Change of scale property, Laplace Transform of integral, Laplace Transform of Derivative.
		Laplace Transform of some special functions: Periodic function, Heaviside Unit Step Function, Displaced Heaviside Unit Step Function Laplace Transform using Heaviside Unit function, Dirac delta function.
		Method to find inverse Laplace Transform:
		i. Use of Laplace Transform table
		ii. Use of Theorem and properties of Laplace
		iii. Use of partial fraction
		iv. Convolution theorem
		v. Use of development of Heaviside Unit Step Function
		Application of Laplace Transform to solve linear differential equation **(12 Hrs)**
Unit-V	:	**Fourier Transform**:
		Fourier integral: Complex form of Fourier integral, sine and cosine integral, Fourier transform and inverse transform. D.U.I.S. rule (only statement), Fourier transform and inverse transform for even and odd function, Fourier sine and cosine transform and inverse transform.
		(7 Hrs)
Unit-VI	:	**Statistics:**
		Measures of central tendency: Mean, Median, Quartiles and Mode. Measures of dispersion: Quartile deviation, Mean deviation, Standard deviation, coefficient of variation. **(5 Hrs)**
Reference Books:	:	1. A Text Book of Applied Mathematics Volume-III by P.N. Wartikar J.N.Wartikar, Pune Vidyarthi Griha Prakashan.
		2. Advanced Engineering Mathematics by H. K. Dass, S. Chand and Co. Ltd.
		3. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
		4. Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publishing Co. Ltd.
		5. Solution to Higher Engineering Mathematics Volume –III by C. P. Gandhi

Section A: Includes Unit I, II and III; **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	
Course Code: MED202	
Course: Strength of Materials	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 3 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 1 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:
1) To provide the basic concepts and principles of strength of materials.
2) To develop the theoretical basis and to derive the theories of the strength of materials and to enable students to systematically solve engineering problemsand design engineering systems.

Unit – I	**Theory of Stresses and Strains** Concept, Types of Stresses and Strains, Poison's Ratio, Stresses and Strains in Simple and Compound Bars under Axial Loading, Stress-Strain Diagram, Hooks Law, Elastic Constants and Relationships, Temperature Stresses and Strains In Simple Bars under Axial Loading, Concept of Surface and Volumetric Stresses and Strains.	
		08 Hrs
Unit – II	**Bending and Deflection of Beams** Relation between Transverse Loads, Shear and Bending Moments, Shear and Bending Moment Diagrams, Pure Bending – Beams with Symmetric Cross-Sections, Beams with Composite Cross-Section, Shear Stresses in Beams, Relationship between Bending Moment. Slope & Deflection, Mohr's Theorem, Moment Area Method, Method of Integration, Macaulay's Method, Calculations for Slope and Deflection of (i) Cantilevers And (ii) Simply Supported Beams (iii) Overhang Beams	
		12 Hrs
Unit – III	**Thin Cylindrical and Spherical Shells** Thin Pressure Vessels, Circumferential and Longitudinal Stresses, Cylindrical and Spherical Objects Subjected to Internal Fluid Pressure, Volumetric Strains.	
		04 Hrs
Unit – IV	**Principal Stresses** Direct and Bending Stresses with Axial Loads, Core of Section, Eccentrically Loaded Short Struts & Chimneys. Concept of Stress on Oblique Plane in Two Dimensional Stress System, Planes of Maximum Shear, Mohr's Circle of Two Dimensional and Three Dimensional Stresses.	

		08 Hrs
Unit – V	**Theory of Torsion** Torsion of Thin Circular Tube, Solid and Hollow Circular Shafts, Tapered Shaft, Stepped Shaft and Composite Circular Shafts, Combined Bending and Torsion, Equivalent Torque,Torsional Moment Diagrams, Effect of End Thrust.	
		10 Hrs
Unit – VI	**Energy Methods** Strain Energy due Gradually Applied Loads, Suddenly Applied Loads & Impact Loads. Stored Energy In Elastic Members: Axial, Torsional & Bending, Castigliano's First & Second Theorem, Application of Castigliano's Theorem to Different Classes of Problems, Virtual Work Principles – The Basis.	
		06 Hrs

List of Reference Books, e – Books, e – Journals			
Sr. No.	**Title**	**Author**	**Publications**
1	Strength of Materials	S. Ramamrutham	Dhanpatrai & Sons Publications
2	Strength of Materials	R. K. Bansal	Laxmi Prakashan
3	Strength of Materials	R. S. Khurmi	S. Chand
4	Strength of Materials	S. S. Ratan	TMH Publication
5	Elements of Strength of Materials	Timoshenko	D. Van Nostrand Company Inc.

Section A: Includes Unit I, II and III; **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each.

4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	

Course Code: MED203	
Course: Fluid Mechanics	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 4 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:
1) Prepare the students for effective use of fluid mechanics in the practice of engineering.
2) Introduce property relations relevant to engineering applications.
3) To understand types and properties of fluid and relative study.
4) To understand and study the behaviour of fluid when the fluid is in motion with and without considering the forces on fluid.
5) Solve the problems by applying the fundamental laws of fluid mechanics.

Unit – I	**Introduction to Fluid Statics** **A. Introduction:-** • Scope and Engineering applications. • Properties of Fluids, Types of Fluids. **B. Fluid Statics:-** • Pascal's Law, Hydrostatics law. • Fluid Pressure Measurements with mechanical gauges and manometers. • Total Pressure and centre of pressure on vertical plane, inclined plane and curved surfaces. • Concept of Buoyancy, Archimedes' Principle, • Meta-center, Metacentric height. • Equilibrium of floating and submerged bodies. **08 Hrs**
Unit – II	**Fluid Kinematics and Dynamics** **A. Fluid Kinematics:-** • Introduction, types of fluid flow • Continuity equation in Cartesian coordinates, Polar coordinates, • Concept of Velocity Potential and Stream Function • Free and forced vortex flow, Radial flow **B. Energy Equation and its applications:-** • Forces acting on fluids in motion, • Euler's equation of motion, • Bernoulli's equation and its applications such as venturimeter, orifice

	meter and pitot tube, • The Momentum equation, • Force exerted by flowing fluid on a pipe-bend, **C. Introduction to Computational Fluid Dynamics:-** • The Need of CFD, • Applications of CFD Introduction to Basic CFD/Numerical Methods **10 Hrs**
Unit – III	**Dimensional Analysis and Similarity** • Dimensions of various physical quantities • Dimensional homogeneity • Rayleigh's method • Buckingham's π Theorem, • Types of similarities, • Dimensionless numbers and their significance **06 Hrs**
Unit – IV	**External Incompressible Viscous Flow** **A. Boundary Layer Theory**:- • Concept of boundary Layer, Thickness of Boundary Layer. • Displacement thickness, Momentum thickness and Energy thickness. • Separation of boundary layer. **B. Fluid Flow About Immersed Bodies:-** • Drag:-Pure Friction Drag: Flow over a Flat Plate Parallel to the Flow. • Pure Pressure Drag: Flow over a Flat Plate Normal to the Flow. • Friction and Pressure Drag: Flow over a Sphere and Cylinder. • Lift. **09 Hrs**
Unit – V	**Flow Through Pipes** • Shear Stress Distribution in Fully Developed Pipe Flow. • Turbulent Velocity Profiles in Fully Developed Pipe Flow. • Energy Considerations in Pipe Flow • Kinetic Energy Coefficient • Head Loss, Calculation of Head Loss • Major Losses, Friction Factor. • Minor Losses. **09 Hrs**
Unit – VI	**Introduction to Compressible Flow** • Introduction

	• Propagation of sound waves • Types of flow:-Mach Cone, Sonic, Subsonic and Supersonic flow • Basic Equations for One-Dimensional Compressible Flow **06 Hrs**	

	List of Reference Books, e – Books, e – Journals		
Sr. No.	**Title**	**Author**	**Publications**
1	Fluid Mechanics and Hydraulic Machines	R. K. Bansal	Laxmi Publication
2	Fluid Mechanics Fundamentals and Applications	Yunis A. Cengel and John M. Chimbala	TMH
3	Fluid Mechanics	V.L. Streeter & E.B. Wylie	TMH
4	Fox and McDonald's Introduction to Fluid Mechanics	Philip J Pritchard and John C Leylegian	JOHN WILEY & SONS, INC.
5	Hydraulics and Fluid Mechanics	Modi & Seth	Standard Book House

Section A: Includes Unit I, II and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
	(Faculty of Science and Technology)
	Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED204

Course: Manufacturing Process – I	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 4 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:

1) On successful completion of this Course, students should be able to conversant with primary and secondary manufacturing processes such as Shaping processes like Solidification processes, Particulate processing, Deformation processes and Joining processes.

Unit – I	**Introduction to Overview of Manufacturing** ● Manufacturing Definition, Manufacturing Industries and Products ● Materials in Manufacturing : Metals, Ceramics, Polymers, Composites ● Manufacturing Processes : Processing Operations, Assembly Operations, Production Machines and Tooling **04 Hrs**
Unit – II	**Solidification Processes Metal Casting Fundamentals** ● Overview of Casting Technology : Casting Processes, Sand-Casting Moulds ● Heating and Pouring: Foundry practices-Cupolas, Direct Fuel-Fired Furnaces, Crucible Furnaces, Electric-Arc Furnaces, Induction Furnaces. ● Solidification and Cooling : Solidification of Metals, Shrinkage, Directional Solidification, Riser Design **Sand Casting** ● Patterns and Cores, Molds and Mold Making, The Casting Operation **Expandable Mould Casting Processes** ● Shell Molding, Vacuum Molding, Investment Casting, Plaster-Mold and Ceramic-Mold Casting **Permanent Mould Casting Processes** ● The Basic Permanent-Mold Process, Variations of Permanent-Mold Casting, Die Casting, Squeeze Casting and Semisolid Metal Casting, Centrifugal Casting **Casting Quality** ● Casting Defects, Inspection Methods**12 Hrs**

Unit – III	**Metal Forming Processes** **Fundamentals of Metal Forming** ● Classification of metal forming operations, Material Behaviour in Metal Forming, Temperature in Metal Forming, Strain Rate Sensitivity, Friction and Lubrication in Metal Forming **Bulk Deformation Process** ● Rolling: Flat Rolling and Its Analysis, Shape Rolling, Rolling Mills ● Forging : Open-Die Forging, Impression-Die Forging, Flash less Forging, Forging Hammers, Presses, and Dies ● Extrusion : Types of Extrusion, Extrusion Dies and Presses, Extrusion Processes, Defects in Extruded Products ● Wire and Bar Drawing : Analysis of Drawing, Drawing Practice, Tube Drawing **08 Hrs**
Unit – IV	**Joining and Assembly Processes** **Welding Processes** ● Types of Welding Processes, Types of Joints, Types of Welds, Features of a Fusion-Welded Joint, HAZ ● Weld Quality: Welding Defects, Inspection and Testing Methods ● Design Considerations in Welding **Fusion Welding** ● Arc Welding : General Technology of Arc Welding, Consumable-Nonconsumable Electrodes ● Resistance Welding : Power Source in Resistance Welding, Resistance-Welding Processes ● Oxyfuel Gas Welding : Oxyacetylene Welding, Alternative Gases for Oxyfuel Welding ● Other Fusion-Welding Processes **Solid State Welding** ● Solid-State Welding : General Considerations in Solid-State Welding, Solid State-Welding Processes **Brazing, Soldering, and Adhesive Bonding** ● Brazing Methods, Soldering Methods, Adhesive Application Technology **Mechanical Assembly** ● Threaded Fasteners, Rivets and Eyelets, Assembly Methods Based on Interference Fits **10 Hrs**

Unit – V	**Shaping Processes for Plastics** • Types of Polymers, Properties of Polymer Melts • Extrusion :Process and Equipment, Defects in Extrusion • Production of Sheet and Film • Injection Molding : Process and Equipment, The Mold, Injection Molding Machines, Shrinkage and Defects in Injection Molding • Compression and Transfer Molding • Blow Molding and Rotational Molding • Thermoforming **06 Hrs**	
Unit – VI	**Sheet Metal Working** • Cutting Operations : Shearing, Blanking, Punching, cut-off, piercing, perforating, notching, lancing • Forming Operations : Bending, flanging, curling, ribbing, corrugating, hemming, crimping, • Drawing : Redrawing, deep drawing, Defects in Drawing • Dies and Presses for Sheet-Metal Processes **Powder Metallurgy** ● Powder metallurgy as manufacturing process : need, process, advantages and applications **08 Hrs**	

List of Reference Books, e – Books, e – Journals			
Sr. No.	**Title**	**Author**	**Publications**
1	Fundamentals of Modern Manufacturing	Mikell P. Groover	John Wiley & Sons
2	Materials and Processes in Manufacturing	Degarmo, J. T. Black, Ronald A. Kohser	John Wiley & Sons
3	Production Technology,	Jain R.K.	Khanna Publications
4	Workshop Technology	B S Raghuwanshi	Dhanpat Rai and Sons
5	Workshop Technology	Hajra Chaudhary	Dhanpat Rai and Sons
6	Manufacturing Process II	H.S. Bawa	Tata Mc Graw hill Publishing Co. Ltd
7	Manufacturing Science	Amitabh Ghosh	East-West press

8	Processes and Materials of Manufacture	Roy A. Lind Berg	Prentice Hall Publications

Section A: Includes Unit I, II and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question No. 1 and 6 should be objective in nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	

Course Code: MED205	
Course: Metrology & Quality Control	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 4 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:
1) Selection of tool and techniques for determining geometry and dimensions.
2) Design and calibration of measuring tools and equipment's.
3) Application of Quality Control Techniques.
4) Application of Quality Management Concept.

Unit – I	**Introduction to Metrology** **Basic Concepts** Legal Metrology - Precision - Accuracy - Types of errors - Linear and Angular Measurements, Standards of Measurements - Slip gauges - Calibration - Interchange ability and selective assembly. **Introduction to Comparators** Types of Comparators - Mechanical, Mechanical–Optical, Electrical and Electronic, pneumatic, Fluid Displacement - Automatic gauging machines. Co-ordinate Measuring Machine. **10 Hrs**
Unit – II	**Screw Thread – Gear Measurements** **Internal and External screw threads** Measurements of various elements of thread - Best size wire - Two and three wire method. **Gear** Measurements of various elements - Constant chord method - Base tangent method. **06 Hrs**
Unit – III	**Surface Finish Measurement and Interferometry** **Surface Finish** Surface topography definitions - Measurement of Surface Texture - Methods - Evaluation of Surface finish. Meaning of RMS and CLA values, Grades of roughness, specifications. **Interferometry** Principle of light wave interference - Light sources - Types of Interferometers.

	Measurement of straightness - Flatness - Squareness - Parallelism – and Circularity.	
		08 Hrs
Unit – IV	**Statistical Quality Control** Introduction - Definition of Quality - Chance Causes and assignable Causes - SQC Benefits and Limitations. Fundamental concepts in probability - Normal curve - Measures of Dispersion - Distributions - Binomial, Poisson, Geometric, Hyper geometric, Poisson as an approximation to Binomial, Normal as an approximation to Binomial.	
		08 Hrs
Unit – V	**Theory of Control Charts** Control Charts for Variables - X bar and R charts, Standard deviation charts – run up - run down - Process capability studies. Control Charts for attributes - Fraction defectives - and number of defects - chart sensitivity.	
		08 Hrs
Unit – VI	**Acceptance Sampling** Basic Concepts and OC curve - AQL - LTPD - AOQL - Sampling Plans - Simple - Double - Multiple and sequential sampling plans - stratified sampling plans for variables. Related problems using BIS code books.	
		08 Hrs

List of Reference Books, e – Books, e – Journals			
Sr. No.	**Title**	**Author**	**Publications**
1	Engineering Metrology	Jain. R. K.	Khanna Publishers, New Delhi
2	Engineering Metrology	Hume K.J.	Macdonald Publications
3	Statistical Quality Control	Gupta. R. C.	Khanna Publishers, New Delhi
4	Statistical Quality Control	Grant S.P.	Tata McGraw hill Publication
5	Quality Control	Kulkarni V. A. and Bewoor A. K.	John Wiley Publication
6	Measurement System Applications and Design	Doeblin, E. O.	McGraw Hill, London
7	Juran J. M.	Quality Handbook	McGraw Hill, London

Section A: Includes Unit I, II and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science and Technology)
Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED206	
Course: Engineering Thermodynamics	**Credits:** 2
Teaching Scheme:	**Class Test:** 10 Marks
Theory: 2 Hrs/week	**Theory Examination:** 40 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 2 Hrs

Objectives:
1) Prepare the student for effectively use of thermodynamics in the practice of engineering.
2) Introduce property relations relevant to engineering thermodynamics.
3) Solve problems by applying the first and second law of thermodynamics.

Unit – I	**First Law of Thermodynamics** • Conservation of Mass and the Control Volume • Conservation of Energy for a Control Volume • Analysis of Control Volumes at Steady State • Engineering Applications of Steady Flow Energy Equation (S.F.E.E.) Such as, Water turbine, Steam or gas turbine, Centrifugal water, pump, Centrifugal compressor, Reciprocating compressor, Boiler, Condenser, Evaporator, Steam nozzle • Throttling Process and Joule-Thompson Porous Plug Experiment • Heating-Cooling and Expansion of Vapours **06 Hrs**
Unit – II	**Second Law of Thermodynamics** • Limitations for First Law of Thermodynamics • Heat Engines and Refrigerators • The Second Law of Thermodynamics • The Reversible Process and Factors that Render Processes Irreversible • The Carnot Cycle • Two Propositions Regarding the Efficiency of a Carnot Cycle • Entropy Generation, • Principle of the Increase of Entropy, • Engineering Applications. **06 Hrs**
Unit – III	**Ideal Gas** • Characteristic equation of state for a Perfect Gas • P-V and T-s Diagrams for Work transfer and Heat transfer in Reversible

	Processes • Equation of state for Real Gas • Internal energy of a gas and Joule's Law • Specific Heats of a Gas and relation between them • Different Gas Processes and Heat and Work Transfer in various Gas processes • Concept of Entropy in different gas processes **06 Hrs**

Unit – IV	**Properties of Pure Substance**
	• Properties and important definitions of Pure Substance
	• Phases of a Pure Substance
	• Phase-Change Processes of Pure Substances
	   ➢ Compressed Liquid and Saturated Liquid
	   ➢ Saturated Vapour and Superheated Vapour
	   ➢ Saturation Temperature and Saturation Pressure
	   ➢ Some Consequences of Saturation Temperature and Saturation Pressure dependence
	• Thermodynamic relations involving entropy
	• Properties of steam
	• Enthalpy-entropy (*h-s*) chart or Mollier diagram
	• Dryness fraction measurement
	 06 Hrs

Sr. No.	Title	Author	Publications
List of Reference Books, e – Books, e – Journals			
1	Fundamentals of Thermodynamics	Claus Borgnakke and Richard e. Sonntag	John Wiley and Sons Publication
2	Fundamentals of Engineering Thermodynamics	Michael J. Moran Howard N. Shapiro	John Wiley and Sons Publication
3	Basic and Applied Thermodynamics	P.K. Nag	TMH Publication
4	Thermodynamics: An engineering approach	*Yunus* A *Cengel*; *Michael* A *Boles*.	TMH Publication

Section A: Includes Unit I, II;   **Section B**: Includes Unit III, IV.

Pattern of Question Paper:

The four units in the syllabus shall be divided in two equal parts i.e. 2 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

1. Minimum Eight questions
2. Four questions in each section
3. Question no 1 from section A and Question no 5 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 5 should be of objective nature.
4. Two questions of 07 marks each from remaining questions from each section A and B be asked to solve.

	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
	(Faculty of Science and Technology)
	Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED221

Course: Fluid Mechanics	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 25 Marks
Practical: 2 Hrs/week	**Practical Examination:** 25 Marks

Objectives:
1) To understand fundamental concepts in fluid mechanics by performing following experiments.

List of Practicals	1) Study of pressure measuring devices
	2) Determination of kinematic viscosity using Redwood Viscometer
	3) Determination of metacentric height
	4) Experimental verification of Bernoulli's theorem.
	5) Reynolds Experiment to observe types of fluid flow
	6) Determination of coefficient of discharge for venturimeter
	7) Determination of coefficient of discharge for orifice meter
	8) Determination of coefficient of friction in pipes
	9) Determination of minor losses in piping system / pipe fittings
	10) Simple application of the Euler method using excel work book
	11) Simple numerical modelling of the Laplace equation using excel work book
	12) Assignments on Unit I,II and Unit V,VI

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment
- Oral examination conducted (internally) on the syllabus and the term work mentioned above

Practical Examination:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and Viva-voce based on the syllabus.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science and Technology)
Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED222

Course: Strength of Materials	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 50 Marks
Practical: 2 Hrs/week	

Objectives:

1) Students should understand behaviour of different materials under action of various types of loadings.

	1) Tension Test on Ductile Material Like Mild Steel or TOR Steel
	2) Flexural Test on Timber Beam
List of Practicals	3) Shear Test on Metals (Single and Double Shear)
	4) Impact Test on Metals (Izod and Charpy)
	5) Torsion Test on Mild Steel
	6) Hardness Test on Metals (Rockwell and Brinell)

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment
- Oral examination conducted (internally) on the syllabus and the term work mentioned above

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	
Course Code: MED223	
Course: Metrology & Quality Control	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 25 Marks
Practical: 2 Hrs/week	**Practical Examination:** 25 Marks
Objectives:	
1) Selection of tool and techniques for determining geometry and dimensions.	
2) Design and calibration of measuring tools and equipment's.	
3) Application of Quality Control Techniques.	
4) Application of Quality Management Concept.	
List of Practicals	1) Determination of linear and angular dimensions of given composite part using precision/non precision measuring instruments
	2) Error determination with linear / angular measuring instruments.
	3) Verification of dimensions & geometry of given components using Mechanical & Pneumatic comparator.
	4) Identification of surfaces using optical flat/interferometers and measure surface roughness using surface roughness tester.
	5) Determination of geometry & dimensions of given composite object using profile projector
	6) Measurement of various angles of single point cutting tool using tool maker's microscope.
	7) Measurement of thread parameters using floating carriage diameter measuring machine.
	8) Measurement of spur gear parameters using Gear Tooth Vernier, Span, Gear Rolling Tester.
	9) Determination of given geometry using coordinate measuring machine (CMM)
	10) Determination of process capability from given components and plot variable control chart/ attribute chart.

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment

- Oral examination conducted (internally) on the syllabus and the term work mentioned above

Practical Examination:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and Viva-voce based on the syllabus.

	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
	(Faculty of Science and Technology)
	Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED224	
Course: Work Shop Practice – II	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 25 Marks
Practical: 2 Hrs/week	**Practical Examination:** 25 Marks

Objectives:

1) The subject intends to make the students aware and understand the basic manufacturing operations in engineering fields. Also to develop work culture and ability to work in a team and as an individual to acquire the skills.

List of Practicals	**Plumbing:** Study of plumbing tools and their uses, standards accessories used in plumbing .Workshop diary – Sketch of job, List of various operations and tools. Practical: one job of thread cutting on G.I. Pipe
	Pattern Making: Study of pattern making tools. Workshop diary – Sketch of job, List of various operations and tools. Practical: one job of pattern making.
	Foundry: Study of sand moulding, Types of sands and moulding equipment's. Workshop diary – Sketch of job, List of various operations and tools. Practical: One job of moulding (Single or multi -piece pattern)
	Welding: Study of arc welding machines, MIG welding machine and welding equipment's. Workshop diary – Sketch of job, List of various operations and tools. Practical: One job of welding individually or in group of students of any useful item of daily use using various welding operations.

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment
- Oral examination conducted (internally) on the syllabus and the term work mentioned above

Practical Examination:

The Practical Examination will comprise of two Jobs out of pattern making, foundry and welding. The job will be assessed by two examiners, one will be the internal and other will be external examiner appointed by university.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (All) Semester-III	
Course Code: BSH225	**Credits:1**
Course: Lab V: Development of Skills-II	
Teaching Scheme:	**Termwork: 50 marks**
Practical: 2 hrs/week	

Objectives	1.Students will be able to apply communicative English Grammar in communication.
	2.Students will be able to enhance the level of English vocabulary.
	3.Students will be able to pronounce and articulate words as well as sentences accurately.
	4.Students will be able to understand and apply correct body language eventually.
	5.Students will be able to develop life skills.
	6.Students will be able to develop placeability skills and business correspondence.

	Sr. No.	Section	Contents	Duration
List of Practical	1	English Communicative Grammar	Structure of sentences, types of sentences, clauses, grammatical common errors in English	4 hrs
	2	Vocabulary Building	Usage of words in sentences, common errors in spelling of words, synonyms, antonyms, phrases and idioms	2 hrs
	3	Phonetics	Syllables, Stress, intonation, pronunciation of words, phonetic transcription - conversion of words to phonetic symbols and from phonetic symbols to words, British and American English (basic difference in vocabulary, spelling, pronunciation and structure), non-verbal language.	4 hrs
	4	Non-verbal Communication (Body language)	Posture, gesture, eye contact, facial expression, proxemics, chronemics, appearance and symbols.	2 hrs
	5	Soft Skills	Personality development, self analysis through SWOT, Johari window, interpersonal skills, perception and attitude, values and ethics, career planning.	2 hrs
	6	Placeability Skills	Job application, resume writing, analytical and reasoning test, debate, group discussion, demo presentation and interview skills.	4 hrs
	7	Business Correspondence	Letter writing at work place (hard copy and soft copy), telephone and Email etiquette, report writing.	2 hrs

List of Reference Books	Sr. No.	Title	Author	Publication
	1	The Essence of Effective Communication	Adrian Budday, Ron Ludlow and Fergus' Panton	Prentice Hall of India- Private Ltd.
	2	Communicating in Style	Yateendra Joshi	The energy Resource Institute
	3	Effective Technical Communication	Anne Eisenberge	Mc Graw Hill International Editors
	4	Professional Communication Skills	A. K. Jain, Pravin, S. R. Bhatia, A. M. Sheikh	S. Chand & Company Ltd.
	5	Business Communication	Urmila Rai, S. M. Rai	Himalya Publishing House
	6	Developing Communication Skills	Krishna Mohan and Meera Banerjee	Macmillan India Limited
	7	Better English Pronunciation	J.D.O'Connor.	Cambridge Publication
	8	Professional Communication Skill	Pravil S.R. Bhatia, S.Bhatia	S. Chand & Co
	9	Living English Structure	Allan Walter	Pearson Education India
	10	Communication Techniques & Skill	R.K. Chadha	
	11	Technical Communication- Principles and Practice	Meenakshi Raman & Sangeeta Sharma	Oxford University Press
	12	A course in Phonetics & Spoken English	J.Sethi,P.V.Dharmatma	PHI publication
	13	Communication Skills for Engineers	Sunita Mishra, C. Murli Krishna	Pearson Education
	14	Communication Skills	Leena Sen	PHI
	15	Technical Communication A Reader Centered Approach	Paul V. Anderson	Thomson Publication
	16	Grammar of Spoken and Written English	Dauglas Biber, Geoffrey Leech	Longman
	17	A Practical English Grammar	A.J. Thomson & A.V. Martinet	Oxford University Press
	18	Oxford English Grammar	Sydney Greenbaum	Oxford University Press
	19	Developing Graduate Employability Skills: Your Pathway to Employment	Mercy V. Chaita	Universal Publishers

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad		
(Faculty of Engineering & Technology)		
Syllabus of S. Y. B. Tech. (Mechanical) Semester- IV		
Course Code: BSH251A		**Title: Engineering Mathematics -IV**
Teaching Scheme: 04Hrs/week		**Class Test: 20 marks**
Theory: 03 Hrs/week		**Theory Examination (Duration): 03 Hrs**
Tutorial: 01 Hr/week		**Theory Examination (Marks): 80**
Credits: 04		
Objectives	**:**	1) To develop the mathematical skills of the student related to Function of complex variable and Vectors. 2) To study and apply various types of transforms and partial derivatives. 3) To provide Numerical techniques for solving the practical problem in engineering and technology.
Unit-I	**:**	**Function of complex variable** : Introduction , Analytic function ,Cauchy-Riemann equation in Cartesian and polar coordinates, Harmonic function, orthogonal system, Integration in complex plane: Line integral, Contour integral, Cauchy's integral theorem, Cauchy's integral formula, Extension of Cauchy's theorem on multiply connected region, Singularities, Residues, Cauchy's residue theorem. (**12 Hrs**)
Unit-II	**:**	**Application of Complex Variable:** Evaluation of real integrals: Integration along unit circle and along the upper half semi-circle, Conformal Transformation, Bilinear transformation. (**5Hrs**)
Unit-III	**:**	**Vector Integration:** Line integral, Surface integral, Gauss divergent theorem, Stoke's theorem, Green's theorem. (**7 Hrs**)
Unit-IV	**:**	**Numerical Method:** Solution of algebraic and transcendental equation, Newton Raphson method, Lagrange's interpolation, Solution of linear simultaneous equation by Gauss Elimination method, Gauss-Seidel method, Solution of ordinary differential equations: Taylor series method, Fourth order Runge-Kutta method.(**10 Hrs**)
Unit-V	**:**	**Probability:** Introduction, Probability Distributions: Binomial Distribution, Poisson Distribution, Normal Distribution. (**6 Hrs**)

Unit-VI	:	**Application of partial differential equation** :
		Solution of partial differential equation by method of separation variable, Application to
		i. Vibration of a string (The wave equation) (without proof)
		ii. One dimensional heat flow (The diffusion equation) (without proof)
		iii. Two dimensional heat flow (The diffusion equation) (without proof)
		(8 Hrs)
Reference Books:	:	1. A Text Book of Applied Mathematics Volume-III BY P.N. Wartikar J.N.Wartikar, Pune Vidyarthi Griha Prakashan.
		2. Advanced Engineering Mathematics BY H. K. Dass, S. Chand and Co. Ltd.
		3. Higher Engineering Mathematics BY Dr. B. S. Grewal, Khanna Publishers.
		4. Higher Engineering Mathematics BY B. V. Ramana, Tata McGraw-Hill Publishing Co. Ltd.
		5. Solution to Higher Engineering Mathematics Volume –III BY C. P. Gandhi

Section A: Includes Unit I, II and III; **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
	(Faculty of Science and Technology)	
	Syllabus of S. Y. B.Tech (Mechanical)	
Course Code: MED252		
Course: Machine Drawing		**Credits:** 4
Teaching Scheme:		**Class Test:** 20 Marks
Theory: 4 Hrs/week		**Theory Examination:** 80 Marks
Tutorial: 0 Hr/Week		**Theory Examination (Duration):** 4 Hrs

Objectives:

1) The subject intends to make the students understand various curves used in machine components and their development.

2) Interpret the industrial drawings and understand various conventions of machine components.

3) Visualize and construct the assembly of given set of individual components.

Unit – I	**Development of Surfaces** Draw the development of surfaces for sections of Prisms, Cylinders, Pyramids and Cones.	
		08 Hrs
Unit – II	**Interpenetration of Solids** Draw the curves of interpenetration of the surfaces of the solids such as Cylinder, Prism, Pyramid, Cone and Sphere.	
		08 Hrs
Unit – III	**Auxiliary Views** Study of auxiliary planes, projection of objects on auxiliary planes, completing the regular views with the help of given auxiliary views.	
		08 Hrs
Unit – IV	**Engineering Curves** Draw the various curves like ellipse, Parabola, Hyperbola, Involute, Cycloid, Epicycloid, Hypocycloid and Helix.	
		04 Hrs
Unit – V	**Conventional Representations** Representation of elements of machine drawing: Engineering Materials, Surface finishes, tolerances, Different types of Screw threads. Component Drawings: Bolts and Nuts, Locking devices, Keys and Cotter joints, welded joints, Knuckle Joint, Riveted joints, Shaft Couplings, Bearings and Pipe joints.	
		10 Hrs

Unit – VI	**Preparing Assembly from given Component Details** Constructing the Assembly drawing of Foot Step Bearing, Steam Stop Valve, Non-return Valve, Safety Valve, Cross Head, Piston and Connecting Rod, Lathe Tail Stock, Drill jig etc. From the given component details. **10 Hrs**

List of Reference Books, e – Books, e – Journals			
Sr. No.	Title	Author	Publications
1	Machine Drawing	N. D. Bhatt	Chartor Publication
2	Machine Drawing	R. K. Dhawan	S. Chand and co.
3	Machine Drawing	P. S. Gill	S. K. Katariya & sons
4	Engineering Drawing	N. D. Bhatt	Chartor Publication
5	Machine Drawing	Sidheswar and Sastry	TMH Publications

Section A: Includes Unit I, II and III; **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:
1. Minimum ten questions
2. Five questions in each section
3. Question no 1 to 5 from section A will be of 13 marks each and Question no 6 to 8 from section B will be of 12 marks each and Question no 9 and 10 from section B will be of 24 marks each and should cover complete syllabus of the respective section.

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Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science and Technology)

Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED253	
Course: Manufacturing Process – II	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 4 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:

1) On successful completion of this Course, students should be able to conversant with conventional and non-conventional machining processes.

Unit – I	**Metal Removal Processes** • Overview of Machining Technology, Classification of material removal processes, Types of Machining Operations • Cutting Tools, Tool Materials, Single-Point Tool Geometry Tool life, Tool wear • Cutting Conditions, Machine Tools and classification • Economics of metal cutting **Theory of Metal Machining** • Theory of Chip Formation in Metal Machining , The Orthogonal Cutting Model • Force Relationships and the Merchant Equation • Power and Energy Relationships in Machining **08 Hrs**
Unit – II	**Machining Operations and Machine Tools** • Machining and part geometry **Turning and Related Operations** • Cutting Conditions in Turning • Operations Related to Turning • The Engine Lathe, Turret, capstan, Semi/Automatic Lathe, CNC turning center • Boring Machines **10 Hrs**
Unit – III	**Drilling and Related Operations** • Cutting Conditions in Drilling • Geometry of twist drill • Operations Related to Drilling • Drill Machines : General purpose, special purpose and Mass production

		06 Hrs
Unit – IV	**Milling** • Types of Milling Operations • Cutting Conditions in Milling • Milling Machines : Types, construction and operations **Other Machining Operations** • shaping and planning • broaching • Sawing **Machining Operations For Special Geometries** • Screw Threads : External Threads, Internal Threads • Gears : Form Milling, Gear Hobbing, Gear Shaping	
		10 Hrs
Unit – V	**Grinding and Other Abrasive Processes** **Grinding :** • Types of grain action in grinding • The Grinding Wheel: Abrasive Material, Grain Size, Bonding Materials, Wheel Structure and Wheel Grade, Grinding Wheel Specification • Analysis of the Grinding Process • Grinding Operations and Grinding Machines : Surface Grinding, Cylindrical Grinding, Center less Grinding **Related Abrasive Processes** • Honing • Lapping • Super finishing • Polishing and Buffing	
		10 Hrs
Unit – VI	**Non-Conventional Machining Processes** • Need, benefits, classification • Mechanism of metal removal, parameters, advantages disadvantages and applications of EDM, ECM, LBM, USM, AJM, WJM	
		04 Hrs

List of Reference Books, e – Books, e – Journals			
Sr. No.	**Title**	**Author**	**Publications**
1	Fundamentals of Modern Manufacturing	Mikell P. Groover	John Wiley & Sons

2	Materials and Processes in Manufacturing	Degarmo, J. T. Black, Ronald A. Kohser	John Wiley & Sons
3	Production Technology	Jain R.K.	Khanna Publications
4	Workshop Technology	B. S. Raghuwanshi	Dhanpat Rai and Sons
5	Workshop Technology	Hajra Chaudhari	Dhanpat Rai and Sons
6	Manufacturing Processes	H. S Bawa	TMH Publications

Section A: Includes Unit I, II and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:
The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:
1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	

Course Code: MED254	
Course: Applied Thermodynamics	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 3 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 1 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:
1) Prepare the student for effectively use of thermodynamics in the practice of engineering.
2) To analyzed the vapourpower plant and its Sub-systems in which the working fluid is alternately vaporized and condensed.
3) To assess the performance of air power cycles.
4) To assess the performance of air compressor.

Unit – I	**Reacting Mixtures and Combustion** ● Terminology of fuels and Combustion ● Calorific value of fuel ● Analysis of Combustion of fuel ● Theoretical and Actual Combustion Processes ● Enthalpy of Formation and Enthalpy of Combustion ● Determination of air requirement for combustion ● Flue gas analysis ● Engineering applications **08 Hrs**
Unit – II	**Boiler Performance and Boiler Draught** **Boiler performance** ● Boiler efficiency, ● Equivalent evaporation, ● Boiler trial and heat balance. **Boiler draught** ● Natural& Artificial drafts, ● Chimney height, ● Maximum draft and chimney efficiency **08 Hrs**
Unit – III	**Steam Nozzle and Condensers** **Steam nozzle** ● One dimensional steady flow in nozzles ● Choked flow

	• Off design operation of nozzle • Effect of friction on nozzle • Super saturation phenomenon in steam nozzles **Condenser** • Classification of Condenser • Condenser Performance Measurement • Cooling Tower **08 Hrs**

Unit – IV	**Steam Power Cycles**
	• Carnot Cycle
	• Rankine Cycle: The Ideal Cycle for Vapour Power Cycles
	• Energy Analysis of the Ideal Rankine Cycle
	• Effect of Pressure and Temperature on the Rankine Cycle,
	• Ideal Reheat Rankine Cycle
	• Ideal Regenerative Rankine Cycle
	    ➢ Open Feed water Heaters
	    ➢ Closed Feed water Heaters
	• Case Study: Exergy Accounting of a Vapour Power Plant
	 08 Hrs

Unit – V	**Air Standard Power Cycles** • Air-Standard Assumptions • The Carnot Cycle and Its Value in Engineering • Energy Analysis of the Otto Cycle • Energy Analysis of the Diesel Cycle • Energy Analysis of the Duel Cycle • Comparison amongst Otto, Diesel and Dual Cycle • Second-Law Analysis of Air-standard Power Cycles **08 Hrs**
Unit – VI	**Reciprocating Air Compressor** • Introduction to the air Compressor • Constructional details of reciprocating Air Compressor. • Analysis of Single stage and multistage reciprocating air compressor with and without clearance • Perfect and Imperfect intercooling in air compressor • Optimization of multistage compressor work **08 Hrs**

Sr. No.	Title	Author	Publications
List of Reference Books, e – Books, e – Journals			
1	Applied Thermodynamics	P.K. Nag	TMH Publication
2	Applied Thermodynamic	Onkar Singh	New age Publication
3	Fundamentals of Thermodynamics	Claus Borgnakke and Richard e. Sonntag	John Wiley and Sons Publication
4	_Fundamentals of Engineering Thermodynamics	Michael J. Moran Howard N. Shapiro	John Wiley and Sons Publication
5	Thermodynamics: An engineering approach	Yunus A Cengel; Michael A Boles.	TMH Publication

Section A: Includes Unit I, II and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question No. 1 and 6 should be objective in nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	

Course Code: MED291	
Course: Alternative Energy Sources (Elective – I)	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 4 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:

1) To impart the basic knowledge of various renewable energy resources and energy systems for power generation & power plants when the conventional sources are scarce in nature.

2) To explore society's present needs and future energy demands, examine conventional energy sources and systems and then focus on alternate energy sources.

Unit – I	**Introduction** Renewable and non-renewable energy sources, their availability and growth in India; energy consumption as a measure of Nation's development; strategy for meeting the future energy requirements. **04 Hrs**
Unit – II	**Solar Energy** Solar radiation - beam and diffuse radiation; instruments used measurement of solar radiation; Principles, general description and design procedures of flat Plate and concentrating collectors and types, Solar energy storage systems - their types, characteristics and capacity; solar ponds. Applications of solar energy in water, space and process heating, solar refrigeration and air conditioning; water desalination and water pumping; solar thermal power generation; solar cells and batteries. **10 Hrs**
Unit – III	**Wind Energy** Principle of wind energy conversion; Basic components of wind energy conversion systems; wind mill components, various types and their constructional features; design considerations of horizontal and vertical axis wind machines: analysis of aerodynamic forces acting on wind mill blades and estimation of power output; wind data and site selection considerations. **10 Hrs**
Unit – IV	**Direct Energy Measurement System** • Magnetic Hydrodynamic (MHD) operation principle, types and working of different MHD systems – their relative merits; MHD materials and production of magnetic fields.

	• Thermo-electric generators: Thermo-electric effects and materials; thermo-electric devices and types of thermo-electric generators; thermo-electric refrigeration. • Thermionic generators: Thermo ionic emission and materials; working principle of thermionic convertors. • Fuel Cells: thermodynamic aspects; types, components and working of fuel cells. **12 Hrs**
Unit – V	**Biomass Conversion Technologies** • Bio-mass: Concept of bio-mass conversion, photo-synthesis and bio-gasification • Bio gas plants - their type's constructional features and functioning; digesters and their design; Fuel properties of bio gas and community bio gas plants. **06 Hrs**
Unit – VI	**Miscellaneous Non-Conventional energy Systems** • Geothermal: Sources of geothermal energy - types, constructional features and associated prime movers. • Tidal and wave energy: Basic principles and components of tidal and wave energy plants; single basin and double basin tidal power plants; conversion devices Advantages/disadvantages and applications of above mentioned energy systems. **06 Hrs**

List of Reference Books, e – Books, e – Journals			
Sr. No.	**Title**	**Author**	**Publications**
1	Non-conventional Energy Sources	G.D. Rai	Khanna Publishers
2	Non-Conventional Energy Resources	B. H. Khan	Tata McGraw-Hill Education
3	Solar Energy : Fundamentals and Applications	H.P. Garg and Jai Prakash	Tata McGraw Hill
4	Solar Energy: Principles of Thermal Collection and Storage	S.P. Sukhatme	Tata McGraw Hill
5	Solar Engineering of Thermal Processes	John A. Duffic and W. A. Beckman	Tata McGraw Hill
6	Energy Conversion	S. L. Sheldon	Prentice Hall

7	Fuel Cells	O. M. Bockris and S. Srinivasan	McGraw Hill

Section A: Includes Unit I, II and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question No. 1 and 6 should be objective in nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	

Course Code: MED292

Course: Advanced Solid Mechanics (Elective – I)	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 4 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:
1) To provide the basic concepts and principle of elasticity and its applications
2) To provide the knowledge and skills in the field mechanics of solids and its application to structural analysis, machine design and material processing.

Unit – I	**Introduction to Theory of Elasticity** Stress equation of equilibrium, Compatibility equations, Stress-Strain Relations, Solution of elasticity equations stress function approach, Principal stresses, stress invariants, three-dimensional Mohr's circle, octahedral stresses, hydrostatic and deviatoric stresses.	**08 Hrs**
Unit – II	**Bending of Beams** Bending of symmetrical and unsymmetrical straight beams, Shear stresses in beams shear center and shear flow, Elastic stability - Euler's buckling load, Eigen-value problem.	**10 Hrs**
Unit – III	**Elastic Materials** Types of Materials, Elastic Materials: Introduction, Theory of elastic constants of Isotropic material, Orthotropic material, Transversely Isotropic material, An-isotropic material, Hyperelastic material.	**06 Hrs**
Unit – IV	**Energy Methods** Principle of superposition, Elastic strain energy and Complementary energy, Reciprocal relations, Principle of virtual work, Kirchhoff's theorem.	**06 Hrs**
Unit – V	**Theories of Elastic Failure** Maximum Principal stress theory (Rankine), Maximum shear stress theory (Guest - Tresca), Maximum Principal strain (Saint - venant) Theory, Total strain energy per unit volume (Haigh) Theory, Shear strain energy per unit volume Theory (Von – Mises & Hencky).	

		10 Hrs
Unit – VI	**Experimental Measurement of Stress** Photoelasticity: Stress optic law – effect of stressed model in plane and circular polariscopes, Isoclinics & Isochromatics, Fringe order determination Fringe multiplication techniques, Calibration photoelastic model materials. Introduction to Non-destructive Test techniques, Applications of Strain gauge and Strain rosettes.	
		08 Hrs

List of Reference Books, e – Books, e – Journals			
Sr. No.	**Title**	**Author**	**Publications**
1	Mechanics of Materials	Timoshenko, S.P., and Gere, J.M.,	CBS Publishers
2	Advanced Mechanics of Solids	Srinath L. S.	Tata McGraw-Hill
3	Strength of Materials	R. K. Bansal	Laxmi Prakashan
4	An Introduction to the Mechanics of Solids	Crandall, S.H., Dahl, N.C., and Lardner, T.J	Tata McGraw-Hill
5	Elements of Strength of Materials	Timoshenko	D. Van Nostrand Company Inc.

Section A: Includes Unit I, II and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question No. 1 and 6 should be objective in nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad		
(Faculty of Science and Technology)		
Syllabus of S. Y. B.Tech (Mechanical)		

Course Code: MED293	
Course: Total Quality Management (Elective – I)	**Credits:** 4
Teaching Scheme:	**Class Test:** 20 Marks
Theory: 4 Hrs/week	**Theory Examination:** 80 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 3 Hrs

Objectives:
1) To know the basics and philosophies of TQM.
2) To illustrate the use of total quality control tools.
3) To understand the concepts quality circles and kaizen.
4) To understand the techniques of JIT.
5) Concepts of re-engineering, BPR

Unit – I	**Introduction to TQM** Customer orientation, continuous improvement, Quality, Productivity and flexibility, approaches and philosophies of TQM, Quality Awards, Strategic Quality Management, TQM and corporate culture. **08 Hrs**
Unit – II	**Total Quality Control** Basic analytical tools-check sheets, Histograms, Pareto charts, Cause and Effect diagrams, flow charts, scatter diagrams, run charts, Cost of Quality; Quality cost measurement, Reliability and failure analysis. **08 Hrs**
Unit – III	**Quality Circles** Introduction, implementation, formation, intangible impact of quality circle, inhibiting factors, Kaizen: Introduction, the Japanese style of management & Kaizen implementation, modeling kaizen process and benefits. **08 Hrs**
Unit – IV	**Just In Time Manufacturing** Introduction, advantages, approach to quality, importance of KANBAN in JIT, Introduction to ISO 9000 and 14000 series of Quality Standard, Certification Requirements, Evolving Standards. **08 Hrs**
Unit – V	**Business Process Re-engineering** Re-Engineering, definition, strategic value added process, re-engineering trends, incremental improvement program, stages of re-engineering, preparation identification, vision, technical and social design, transformation, Differentiation of BPR. **08 Hrs**

Unit – VI	**TQM Principles** Leadership-Strategic Quality Planning, Employee Involvement, Motivation, Empowerment. Team and team work, Kaizen, PDCA cycle, 5S. Supplier partnership, Supplier selection, Supplier rating. **08 Hrs**

List of Reference Books, e – Books, e – Journals			
Sr. No.	**Title**	**Author**	**Publications**
1	Out of crisis	W. Edward Deming	MIT publishing
2	What is Total Quality Control? The Japanese way	Ishikawa & Lu	Prentice Hall
3	Total Quality Management	D. J. Tally	ASQC Quality Press
4	Total Quality Control	A. V. Feigenbaum	McGraw Hill International Editions, USA
5	Quality Control Handbook	J. M. Juran	McGraw Hill Book Company, USA
6	Kaizen: The key to Japan's Competitive Success	Masaaki Imai	McGraw Hill International Editions, USA

Section A: Includes Unit I, II and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
	(Faculty of Science and Technology)
	Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED255	
Course: Electrical Technology	**Credits:** 2
Teaching Scheme:	**Class Test:** 10 Marks
Theory: 2 Hrs/week	**Theory Examination:** 40 Marks
Tutorial: 0 Hr/Week	**Theory Examination (Duration):** 2 Hrs

Objectives:

1) For Electric Machines to study various basic AC and DC machines: construction, operation, characteristics, losses and advantages disadvantages.

Unit – I	**D. C. Generators** Operating principle, Construction, EMF equation, Methods of excitation, Armature reaction and commutation, Characteristics, Losses, application, Numerical **04 Hrs**
Unit – II	**D. C. Motors** Principle of operation, Significance of back EMF, Torque equation, Characteristics, Starting and speed control, application, Numerical **04 Hrs**
Unit – III	**Induction Motor** Three phase Induction Motor-Operating principle, Construction, Squirrel cage and Slip ring type, Torque equation, Torque-slip Characteristics, Power stages, Speed control, efficiency, Numerical **04 Hrs**
Unit – IV	**Single Phase Induction Motor** Construction, Double field revolving theory, Making Induction motor self-starting, Types—Capacitor start ,Capacitor start & run ,shaded pole, Repulsion **04 Hrs**
Unit – V	**Special Machines** Working principle and application of Servomotor (DC and AC), Stepper motor (Variable reluctance type, permanent magnet type and Hybrid type) **04 Hrs**
Unit – VI	**Transformer** Working Principle and Construction of Three phase Transformer- Various transformer connections(Y/Y, Y/Δ ,Δ/Y, Δ/Δ) (Only theoretical treatment) **04 Hrs**

List of Reference Books, e – Books, e – Journals			
Sr. No.	Title	Author	Publications
1	Electrical Machines	Nagrath Kothari	TMH Publications
2	Electrical Technology	B. L. Theraja	S. Chand Publications
3	ABC of Electrical Engineering	B. L. Theraja	S. Chand Publications
4	Electrical Technology	H. Cotton	Pitman and Sons Publication
5	Principle of Electrical Machines	V. K. Mehta	S. Chand Publications

Section A: Includes Unit I, II, and III;   **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The four units in the syllabus shall be divided in two equal parts i.e. 2 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

1. Minimum Eight questions
2. Four questions in each section
3. Question no 1 from section A and Question no 5 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 5 should be objective in nature.
4. Two questions of 07 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	

Course Code: MED271	
Course: Machine Drawing	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 25 Marks
Practical: 2 Hrs/week	**Practical Examination:** 25 Marks

Objectives:

1) The subject intends to make the students understand various curves used in machine components and their development.
2) Interpret the industrial drawings and understand various conventions of machine components.
3) Visualize and construct the assembly of given set of individual components.
4) Learn to use drafting software to draw machine components.

List of Practicals	1) Using full size sheet (A-1) draw four problems of each on unit 1, 2 and 3
	2) Using full size sheet (A-1) draw four problems on different types of curve for unit no. 4
	3) Using full size sheet (A-1) draw conventions of various machine components for unit no. 5 OR Draw various machine components using any drafting software for unit no.5
	4) Using full size sheet (A-1) draw Assembly drawing of any one assembly given in unit no.6 OR Draw Assembly drawing of any one assembly given in unit no.6 by using any drafting software

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment
- Oral examination conducted (internally) on the syllabus and the term work mentioned above

Practical Examination:

The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and Viva-voce based on the syllabus.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science and Technology)	
Syllabus of S. Y. B.Tech (Mechanical)	
Course Code: MED272	
Course: Applied Thermodynamics	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 25 Marks
Practical: 2 Hrs/week	**Practical Examination:** 25 Marks
Objectives: 1) To Study Principle, construction and working of different thermal systems. 2) To assess the energy performance of thermal systems.	

List of Practicals	1) To Study Principle, Construction and Working of Bomb Calorimeter
	2) To study and Demonstration of Hero's reaction turbine.
	3) To Study Principle, Construction and Working of Steam Engine.
	4) To Study Principle, Construction and Working of Boilers Mountings.
	5) To Study Principle, Construction and Working of Boiler Accessories.
	6) To Study energy balance [Heat Utilization] using any Boiler Model.
	7) To Study ignition timing mechanism [Ignition System] for Otto cycle [Petrol Engine]
	8) To Study the ways of energy conservation by waste minimization.
	9) Performance of Energy assessment of lighting Systems.
	10) Performance of Energy assessment of reciprocating air compressors
	11) Case Study: Exergy Accounting of any Thermal System.
	12) Visit to Thermal Power Station and Report related to it.

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment
- Oral examination conducted (internally) on the syllabus and the term work mentioned above

Practical Examination:

      The practical examination shall consist of performing an experiment based on the practical work done during the course, the record of the experiments submitted by the candidate and Viva-voce based on the syllabus.

	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
	(Faculty of Science and Technology)
	Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED273

Course: Work Shop Practice – III	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 25 Marks
Practical: 2 Hrs/week	**Practical Examination:** 25 Marks

Objectives:

1) The subject intends to make the students aware and understand the basic manufacturing operations in engineering fields. Also to develop work culture and ability to work in a team and as an individual to acquire the skills.

List of Practicals	**Turning Shop:** Study of Different operations to be carried on lathe machine using tail stock, taper turning methods (Calculations), internal and external threading, and facing finishing cuts. Workshop diary – Sketch of job, List of various operations and tools Practical: Preparing two jobs on lathe machine performing all above operations.
	Milling: Study of vertical and horizontal milling machines, milling cutters and different operations to be carried on milling machine. Workshop diary – Sketch of job, List of various operations and tools Practical: Preparing a job individually or in a group of students i.e. Gear blank by turning, External milling of gear teeth involving calculations for indexing.
	Drilling or Boring: Study of different types of drilling machines, Drill and single point boring tool, Workshop diary – Sketch of job, List of various operations and tools. Practical: Preparing a job individually or in a group of students based on drilling, boring internal splines cuts on slotting machine and surface grinding for surface finishing.

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment
- Oral examination conducted (internally) on the syllabus and the term work mentioned above

Practical Examination:

      The Practical Examination will comprise of two Jobs out of pattern making, foundry and welding. The job will be assessed by two examiners, one will be the internal and other will be external examiner appointed by university.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science and Technology)
Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED274	
Course: Electrical Technology	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 50 Marks
Practical: 2 Hrs/week	

Objectives:	
1) For Electric Machines---To study various basic AC and DC machines: construction, operation, characteristics, losses and advantages disadvantages.	

List of Practicals	1) To study DC Shunt motor – 3 Point starter
	2) To study star/delta starter for three phase squirrel cage induction motor.
	3) Internal & external characteristics of DC Shunt generator.
	4) Magnetizing characteristics of DC Shunt generator.
	5) Speed control of DC shunt motor
	6) No load Test (Swinburne's Test) on DC Shunt motor.
	7) To perform speed reversal of DC Shunt motor.
	8) Speed control of three phase induction motor
	9) To perform speed reversal of three phase induction motor
	10) Open Circuit (OC) and Short Circuit Test on single Phase transformer

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment
- Oral examination conducted (internally) on the syllabus and the term work mentioned above

	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
	(Faculty of Science and Technology)
	Syllabus of S. Y. B.Tech (Mechanical)

Course Code: MED275

Course: Development of Skills – III	**Credits:** 1
Teaching Scheme:	**Teachers Assessment :** 50 Marks
Practical: 2 Hrs/week	

Objectives:
1) To understand importance of problem solving issues in professional way.
2) To learn effective utilization of problem solving tools.
3) To understand entrepreneurship skills.
4) To learn effective ways of technical writing skills.

List of Practicals	**1) Problems and Its Resolutions** Definition, types of problems, Collaboration, benefits of collaboration, collaborative problem solving, Evaluation of Conflicts, defusing conflicts, conflicts resolution styles, Effective Conflict Communications. **02 Hrs**
	2) Problem Solving Techniques [Old Tools] Tally sheets, Pareto Diagram, Cause and effect Diagrams, Histograms, Stratification, Scatter Diagram, Control Charts **02 Hrs**
	3) Problem Solving Techniques [New Tools] Affinity Diagram, Relationship diagram, Tree Diagram, Matrix Diagram/ Matrix Data Analysis, Arrow Diagram, Process Decision Program Chart. **02 Hrs**
	4) Problem Solving Strategies [Brain Storming] Introduction to brainstorming, why to use it, Group brainstorming, preparation of the group, Presentation of problem, guiding the discussion, concluding the discussion, taking action on the results generated, recording the results after implementations. **02 Hrs**
	5) Flow Charts Introduction, types: Document Flow charts, Data Flow Charts, System Flow charts, Programme flow charts, Symbols and lines used for generation of the same. **02 Hrs**
	6) Entrepreneurship Definition, need, Successful examples of renowned entrepreneurs

		02 Hrs
	7) Personality Development I Positive Attitude, Will Power, Patience and Creativity **02 Hrs**	
	8) Personality Development II Emotional quotient, IQ, Group Discussion **02 Hrs**	
	9) Marketing Management Introduction, brand audit, marketing strategy, implementation of planning, Reporting, measurement, feedback and control systems International marketing management **02 Hrs**	
	10) Writing Skills Professional writing of reports [Technical], writing of Journals **02 Hrs**	

List of Reference Books, e – Books, e – Journals			
Sr. No.	**Title**	**Author**	**Publications**
1	Quality Planning and Analysis	Juran	TMH Publications
2	Handbook of Effective Technical Communications	Taylor G. Hicks, Carl M., Valerie Sr.	TMH Publications
3	Technical Writing Process and Product	Saron J. Gerson	Prentice Hall Publication
4	Thesis and Assignment	Anderson, Dastan, Poole	Wiley Eastern Limited

The assessment of term work shall be on the following criteria:

- Continuous Assessment
- Performing the experiments in the laboratory/ Study experiment
- Oral examination conducted (internally) on the syllabus and the term work mentioned above