Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Revised Syllabus of Second Year (SY) Bachelor of Technology

Electrical Engineering

(III & IV Semester)

Under Choice Based Credit System (CBCS)

Under Faculty of Science and Technology

(Effective from 2020-21 and onwards)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science & Technology)
Syllabus of S. Y. B. Tech.
(Electronics and Telecommunication, Electrical and Computer Science and Engineering)

(Circuit Branches)

Course Code: BSH201	Credits: 3-0-0
Course: **Vector and Partial Differential Equation**	Mid Semester Examination-I: 15 Marks
	Mid Semester Examination-II: 15 Marks
	Teacher Assessment: 10 Marks
Teaching Scheme:	Term Work: - 00 Marks
Theory: 03 Hrs / week	End Semester Examination: 60 Marks
Tutorial: 00 Hrs / week	End Semester Examination (Duration): 03 Hrs

Prerequisite	Basic formulae of Trigonometry, Derivatives and Integration, fundamentals of Vector algebra, knowledge of multiple integrals, partial derivatives, evaluation of real integrals and odd and even function.
Objectives	1. To understand basic necessity for the foundation of Engineering & Technology 2. To enhance the mathematical skills and thinking power of students 3. To develop the ability, know the concept of Engineering mathematics and apply these to solve Engineering problem in various field 4. To apply mathematical concepts for solving the practical problem in Engineering and Technology
Unit-I	**Linear Differential Equation (LDE) & Its Applications** Solution of nth order linear differential equation with constant coefficients: Complementary function, Particular integral- short method, method of variation of parameters, Application of LDE to Mechanical systems, Beam and shaft (08Hrs)
Unit-II	**Vector Differentiation** Differentiation of vectors, Scalar and Vector point functions, Gradient of a scalar point function, Directional derivative, Divergence and Curl of vector point function, Irrotational and Solenoidal vector fields (06 Hrs)

	Vector Integration
Unit-III	Line integral, Work done by a force, Surface integral, Green's theorem, Stokes's theorem (04Hrs.)
Unit-IV	**Laplace Transform** Definition, Laplace Transforms of elementary functions, Theorems and properties of Laplace transform (without proof): First shifting and second shifting theorem, Change of scale, Multiplication by t^n, Division by t, Laplace transform of Derivatives, Laplace transform of integral, Evaluation of integrals using Laplace transform, Laplace transform of Unit step function and Dirac's delta function, Inverse Laplace transform: Definition, Inverse Laplace transform using: i. Laplace transform table ii. Theorem and properties of Laplace transform iii. Convolution theorem Application of Laplace transform to solve linear differential equations with given initial conditions (08 Hrs)
Unit-V	**Fourier Transform** Fourier transform and inverse Fourier transform, Fourier sine and cosine transform, Inverse Fourier sine and cosine transform (04Hrs)
Unit-VI	**Z - Transform** Definition, Z-transform of elementary function, properties of Z-transform (without proof), Inverse Z transform: Partial fraction method, inversion integral method (Residue method), Solution of Difference equation by using Z-transform. (06Hrs)

	Sr. No.	Title	Author	Publication	Edition
References	1.	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley eastern Ltd	10th Edition
	2.	Higher Engineering Mathematics	B.V. Ramana	Tata McGraw-Hill	11th Edition
	3.	Advanced Engineering Mathematics	C.R. Wylie	McGraw Hill Publications	6th Edition
	4.	Partial Differential Equations	Fritz John	Springer	4th Edition

5.	Thomas' Calculus	Maurice D. Weir, Joel Hass, Frank R. Giordano	Pearson Education	12th Edition
6.	Applied Mathematics	P. N. Wartikar & J. N. Wartikar	Pune Vidyarthi Griha Prakashan,Pune	9th Edition
7.	Higher Engineering Mathematics	Dr.B.S.Grewal	Khanna Publishers	46th Edition
8.	Advanced Engineering Mathematics	H. K. Dass.	S.Chand And Co.Ltd	18th Edition
9.	NPTEL, Swyam, edX, Coursera, Khan Academy…etc course related video			

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. Electrical Engineering)	
Course Code: EED202	Credits: 3-1-0
Course: DC Machines & Transformers	Mid Semester Examination-I: 15 Marks
Teaching Scheme:	Mid Semester Examination-II: 15 Marks
Theory: 3 Hrs/week	Teacher Assessment: 10 Marks
Tutorial: 00 Hr/week	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 3 Hrs
Prerequisite	Student Should have Knowledge of basic electrical principle and electrical technology,
Objectives	1. Understanding on basic principles, operation, performance and control of dc machine and transformer... 2. Use and applications of DC Machines & Transformers on Socio – Industrial Purpose.
Unit-I	**DC Generator:** Basic principle and working of dc generator, Different Types of DC generator, , Types of Armature windings, coil span, pitch of winding, back pitch, front pitch, resultant pitch, commutator pitch, single and double layer winding ,E.M.F. equation, Armature reaction, Demagnetization & cross magnetization, Compensating winding, Commutation. Overcoming of armature reaction, Causes of bad commutation and remedies, Characteristics and applications of different types. Losses, power stages and efficiency (Numerical) (8 Hrs)
Unit-II	**D.C. Motors:** Principle and working of DC motor , Types of dc motor Significance of Back EMF, Torque Equation, , Characteristics and Selection of DC Motors ,Starting of dc motor ,Speed Control of DC Shunt and Series Motors, Braking of DC Motors-Plugging, Dynamic Braking, Regenerative Braking; Losses and Efficiency, Condition for Maximum Efficiency. For various applications of dc motor. (6 Hrs)

Unit-III	**Testing of DC Machines:** Type of tests, a) Routine, Type test and supplementary test. b) Brake test. c) Swinburne's test. d) Regenerative or Hopkinson's test e) Field's test for series motor (4 Hrs)	
Unit-IV	**Single Phase Transformers:** Basic principle and working of transformer , Phasor diagrams on no-load and on load, , Exact and approximate equivalent circuits referred to either side, losses, Efficiency, maximum efficiency, ratings, Open, short circuit and polarity test on transformer, Parallel operation, and conditions to be satisfied, load sharing under various conditions. Autotransformer working and applications (Numerical) (6 Hrs)	
Unit-V	**Three Phase Transformer:** Constructional working details of Three Phase Transformer, Comparison between a bank of three identical single phase transformers and a single three phase transformer, Types, Standard connections and their voltage phasor diagrams, phasor groups, Efficiency, Voltage regulation of transformer, Parallel operation of three phase transformers. (6 Hrs)	
Unit-VI	**Special Motors:** Construction, working and application Stepper Motor and different types, Variable Reluctance motor , servo motor, Hybrid motor, Permanent magnet Motor, Brushless dc motor, applications. (6Hrs)	

	Sr. No.	**Title**	**Author**	**Publication**	**Edition**
References	10.	Principles and practice of Electrical Engineering	Gray Wallace	Nabu Press;	sixth edition
	11.	Theory of AC Machines	Leinsdorf	Tata Mc Graw Hill.	2nd ed. edition
	3	Electrical Machines	Nagnath Kothari D. P. Kothari	TATA McGraw Hill	fifth edition

	4.	Electrical Machines	Ashfaque Hussain.	Dhanpat Rai & Co.	Third edition
	5.	Electrical Technology	B. L. Theraja	S. Chand Limited, 2005	Volume II

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED203	Credits: 3-1-0
Course: Electrical Measurement	Mid Semester Examination-I: 15 Marks
Teaching Scheme:	Mid Semester Examination-II: 15 Marks
Theory: 3 Hrs/week	Teacher Assessment: 10 Marks
Tutorial: 00 Hr/week	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 3 Hrs
Prerequisite	Student should have good knowledge of basic electrical engineering such as Resistor, Inductor, Capacitor, AC & DC Supply, DC Theorems, Single phase transformer, Measuring instruments.
Objectives	1. Classify the different measuring instruments and explain various methods of measurement of resistance. 2. Describe principle and operation of Energy meter, Wattmeter and measurement of power.
Unit-I	**Measurement and Instrumentation theory:** Characteristics of measuring instruments: Static and dynamic, accuracy, linearity, speed of response, dead zone, repeatability, resolution, span, reproducibility, drifts. Need for calibration, standards and their classification. Block diagram of generalized Instrumentation system.(Numerical) (6 Hrs)
Unit-II	**Essentials of indicating instruments:** Revision of Indicating Instruments such as PMMC,MI Ammeter and Voltmeter theory Extension of range of ammeters and voltmeters using shunt, multiplier. Universal shunt, Universal multiplier. Power factor meter, Net metering system. (Numerical) (6 Hrs)
Unit-III	**Measurement of Resistance :** Measurement of low, medium and high resistance. Kelvin's Double Bridge, Ammeter Voltmeter method, Megger, Earth tester for earth resistance measurement, Measurement of insulation resistance when power is ON.

	A.C. Bridges: Introduction, sources & detectors for a.c. bridge, general equation for bridge at balance. Measurement of Inductance: Maxwell's Inductance & Maxwell's Inductance – Capacitance Bridge, Andersons Bridge. Measurement of Capacitance: Shearing Bridge. (12 Hrs)				
Unit-IV	**Instrument Transformers:** Construction, connection of CT & PT in the circuit, advantages of CT / PT over shunt and multipliers for range extension, transformation ratio, turns ratio, nominal ratio, burden etc., and ratio and phase angle error. (Theoretical Treatment) (3 Hrs)				
Unit-V	**Wattmeter theory and measurement of power:** Construction, working, torque equation, errors and their compensation, advantages/disadvantages of dynamometer type wattmeter, low power factor Wattmeter, poly-phase wattmeter. Power measurement in three phase system using three wattmeter method, two wattmeter method (Numerical) (5 Hrs)				
Unit-VI	**Energy meter theory:** Construction, working, torque equation, of single phase conventional induction type energy meter, Block diagram and operation of electronic energy meter. Three-phase energy meters. (Numerical) (4 Hrs)				
References	**Sr. No.**	**Title**	**Author**	**Publication**	**Edition**
	1	A Course in Electrical and Electronic measurements & Instrumentation	A. K. Sawhaney,	Dhanpat Rai & Sons.	
	2	A Course in Electronic and Electronic measurements	J. B. Gupta	S. K. Kataria & Sons.	
	3	Instrumentation: Measurement and Analysis	Nakra &Chaudhari	Tata McGraw Hill, New Delhi.	Sixth Reprint
	4	Electrical measurement & measuring instrument	E. W. Golding & Widing.	A. H. Wheeler & Co. ltd	Fifth edition
	5	Electronic measurement and instrumentation	Dr. Rajendra Prasad	Khanna Publisher,	

				New Delhi.	
	6	Introduction to Measurements and instrumentation	Ghosh	PHI Publication.	Second Edition
	7	Introduction to Measurements and instrumentation	Anand	PHI Publication.	

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED204	Credits: 3-1-0
Course: Network Analysis	Mid Semester Examination-I: 15 Marks
Teaching Scheme:	Mid Semester Examination-II: 15 Marks
Theory: 3 Hrs/week	Teacher Assessment: 10 Marks
Tutorial: 00 Hr/week	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 3 Hrs
Prerequisite	Student should have good knowledge of basic electrical engineering such as Resistor, Inductor ,Capacitor ,AC & DC Supply, Dc Theorems
Objectives	1. Understand and Familiarization of various networks. 2. Understanding the various methods for analysis of electrical networks.
Unit-I	**Graph Theory :** Graph of a network, Definitions, Tree, Co tree, Link, basic loop and basic cut set, Incidence matrix, Cut set matrix, Tie set matrix, Duality, Loop and Nodal methods of analysis. (4 Hrs)
Unit-II	**AC Circuit Analysis:** Voltage and Current laws (KVL/KCL), Network Analysis: Mesh, Super mesh, Node and Super Node analysis. Dot convention for coupled circuits. Network Theorems: Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorem, Tellegen's Theorem, Substitution theorem, Milman's Theorem, Dual Network and Duality theorem , filter and its types. (10 Hrs)
Unit-III	**Transient Circuit Analysis:** Initial Condition and its evaluation, Natural response and forced response i.e. for RL, RC, RLC. Laplace transforms of some important functions, The transformed circuit for R, L, C, RL, RC, and RLC. Transient and steady state responses of RL, RC. (8 Hrs)
Unit-IV	**Two Port Network-I**

	Port in network, Network configuration, Z, Y, H and transmission parameters, Interrelations between parameters Z, Y, H, transmission parameters. (6Hrs)				
Unit-V	**Two Port Network-II** Interconnection of two port network, Open and short Circuit Impedance, Image Impedance, T & π Representation, Ladder and Lattice networks. (4Hrs)				
Unit-VI	**Properties of Network Function:** Driving-Point Functions, Transfer Functions, Analysis of ladder and non-ladder network, poles and zeros of network functions with its location for driving and transfer function, Routh-Hurwitz criterion. (4Hrs)				
References	**Sr. No.**	**Title**	**Author**	**Publication**	**Edition**
	1.	Electrical Network	Ravish R Singh	Mc Graw Hill Education	
	2.	Circuit Theory	A. Chakrabarti	Dhanpat Rai & Co.	6th

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED205	Credits: 3-1-0
Course: Transmission and Distribution	Mid Semester Examination-I: 15 Marks
Teaching Scheme:	Mid Semester Examination-II: 15 Marks
Theory: 3 Hrs/week	Teacher Assessment: 10 Marks
Tutorial: 00 Hr/week	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 3 Hrs
Prerequisite	Magnetic effect of electric current, Kirchhoff's law, Electrostatic, Insulating Materials, Conducting Materials, Fundamentals of Alternating current, Three phase AC circuit
Objectives	1. To understand the behaviour of insulating materials in Transmission and Distribution. 2. To determine different performance parameters of Transmission and Distribution.
Unit-I	**Mechanical design of Transmission Line:** Line supports, spacing between the conductors, length of span, calculation of sag, equal and unequal supports, Types of insulators, pin type, suspension type and strain type insulators, voltage distribution along string of suspension insulators, string efficiency. Corona: Phenomenon of corona, factors affecting the corona, power loss, disadvantages. (6 Hrs)
Unit-II	**Inductance and Resistance of Transmission Line:** Definitions of Inductance, Flux Linkages of an isolated current carrying conductor, Inductance of 1Phase two-wire line, Conductors types, Flux linkages of one conductor in group, Inductance of 3-phase lines, Double circuit 3-phase lines, Bundled Conductors, Resistance, Skin effect and Proximity. (8 Hrs)
Unit-III	**Capacitance of Transmission Line:** Conductor, Potential difference between two conductors of a group of parallel conductors, Capacitance of two wire line, Capacitance of 3-phase line with equilateral spacing, Effect of Earth on transmission line capacitance, Method of GMD and GMR,

		Ferranti Effect.		(8 Hrs)	
Unit-IV		**Characteristics and Performance of Transmission Line:** Short, medium, and long lines, Voltages and currents at sending and receiving end of line, Nominal 'Pi' and 'Tee' Representation, surge impedance loading of transmission line, Power flow through transmission line, Power transmission capability. (6 Hrs)			
Unit-V		**Classification of Distribution Systems:** AC Distribution- Primary and Secondary Distribution systems, Overhead and Underground systems, Connection scheme of distribution system, Radial system, Ring main system, Interconnected systems, feeders and distributors, AC distribution calculations, carrier current equipment (P.L.C.C.) . (4 Hrs)			
Unit-VI		**Underground Cable:** Classification, Construction of cable, XLPE cables (power cable), insulation resistance, capacitance, cable faults and location of faults. (4 Hrs)			
References	Sr. No.	Title	Author	Publication	Edition
	1	Power System Engineering	A Chakraborty, M.L.Soni, P.V.Gupta, U.S. Bhatnagar	Dhanpat rai & Co., Delhi.	
	2	Power System Analysis & Design	B.R.Gupta	4th Reprint, S.Chand Publishing Co.	
	3	Power System Analysis	W.D. Stevenson	Tata McGraw Hill Publications	
	4	Transmission and Distribution	J.B. Gupta	S.K.Kataria & Sons, New Delhi.	
	5	Electric Power Generation, Transmission and	S.N.Singh	Prentice Hall of India.	

		Distribution			
	6	Elements of Power Station Design	M.V. Deshpande	Wheeler Publishing	
	7	Modern Power System Analysis	I.J. Nagrath and D.P.Kothari	Tata Mc Graw Hill Publications.	
	8	Generation and Economic Considerations	J.B.Gupta	S.K.Kataria & Sons, New Delhi.	
	9	Power System Engineering	I.J. Nagrath and D.P.Kothari	Tata McGraw Hill Publications.	
	10	Websites of MERC and MSEDCL Power System Analysis	Arthur R. Bergen.	Pearson Education, New Delhi.	

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED221 Course: Laboratory of DC Machines & Transformers **Teaching Scheme:** Practical: 2 Hrs/week	Credits: **1** Practical: 25 Marks
Objectives :	Understanding the construction, operations and applications of DC Machines & Transformers through practical approach.
List of Practical :	**(Any 10 experiments from following list)** 1. Study of Three Point starter for DC Motors. 2. Magnetizing Characteristics (OCC) Internal, External of DC shunt generator. 3. Load Characteristics of DC Series generator 4. Load Characteristics of DC Shunt generator 5. To perform Starting and Reversing of DC Shunt motor. 6. To perform Speed control of DC shunts motor. 7. To perform Load test on DC series motor 8. To perform Load test on DC shunt motor 9. Efficiency and losses calculation of DC motor by Swinburne's test, and limitations of this test. 10. Short circuit test and open circuit on single phase transformer. 11. Polarity & Turns Ratio test on 1 Phase Transformer. 12. Efficiency and regulation of single phase transformer by direct loading.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED222 Course: Laboratory of Electrical Measurements	Credits: 1
Teaching Scheme: Practical: 2 Hrs/week	Practical: 25 Marks
Objectives :	Understanding and Performing various measuring instruments through practical Demonstrations.
List of Practical :	**(Any 10 experiments from following list)** 1. Measurement of power in three-phase circuit using two wattmeter methods for Balanced Load. 2. Measurement of power in three-phase circuit using two wattmeter methods for Unbalanced Load. 3. Measurement of Reactive power in three phase balanced circuit using 4. One wattmeter method and by one wattmeter method with two way switch. 5. Calibration of Single phase or Three phase static energy meter at different power factors using Digital meters. 6. Measurement of Low resistance using Kelvin's Double Bridge. 7. Measurement of inductance using Anderson's Bridge. 8. Earth resistance measurement by Earth Tester. 9. Extension of instrument range: ammeter, voltmeter, watt meter using CT / PT. 10. Measurement of power in three-phase four wire using three CTs and Two wattmeter's Methods. 11. Study and use of CRO for measurement of Current, Voltage, Time Period, Frequency, Phase angle. 12. Study of electrical transducers.

		13. Study characteristics of measuring instruments.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED223 Course: Laboratory of Network Analysis	Credits: 1
Teaching Scheme: Practical: 2 Hrs/week	Practical: 25 Marks
Objectives :	Understanding and Performing various network analysis parameters through practical demonstrations.
List of Practical :	Perform any 10 experiments 1. Verification of Superposition Theorem. 2. Verification of Thevenin's Theorem. 3. Verification of Nortons Theorem. 4. Verification of Maximum Power Transfer Theorem. 5. Plot frequency response of RLC Series Resonance circuit. 6. Plot frequency response of RLC Parallel resonance circuit. 7. Plot frequency response of Low pass filter. 8. Plot frequency response of High Pass filter. 9. Determination of A, B, C, D parameters of Two port Network. 10. Study of time response of R-L circuit to a step D.C. voltage input. (Rise and decay of current in an inductive circuit). 11. Study of time response of R-L-C series circuit to a step D.C. voltage input. 12. Study of parameter of two port network.(Z,Y,H)

The assessment of term work shall be done based on the following.

- Continuous assessment

- Performing the experiments in the laboratory

Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad		
(Faculty of Science & Technology)		
Syllabus of S. Y. B. Tech. (Electrical Engineering)		

Course Code: EED224	Credits: 1
Course: Transmission and Distribution	Term Work: 25 Marks
Teaching Scheme: Practical: 02 Hrs/week	

Objectives	:	1. Understand different types of transmission line components.
		2. Understand the functions of components used in transmission line and for transfer of electric power.

List of Practical	:	**Study and draw any 05 experiments of the following.**
		1. Study and draw a sketch of different types of insulators.
		2. Draw a single line diagram of a distribution system.
		3. Study and draw feeder distribution system.
		4. Study the transmission tower foundation.
		5. Study the transmission tower erection.
		6. Study the cable jointing methods.
		7. Study the cable preparation, crimping, binding, restoring, and over-sheathing.
		8. Study joints in flexible cables.
		9. Study the procedure for heat shrink straight through joint and jumpering in cables.

The assessment of term work shall be done based on the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad		
(Faculty of Science & Technology)		
Syllabus of S. Y. B. Tech. (Electrical Engineering)		

Course Code: EED 225	Credits: 1
Course: Laboratory of Development of Skills III	Practical: 25 Marks
Teaching Scheme:	
Practical: 2 Hrs/week	

Objectives	**:**	1. Develop the student's technical skills in basic electrical circuits through LT Spice. 2. Make use of simulation software to design the circuits.
List of Practical	**:**	**(Any 10 experiments from following list)** 1. Download and Installation of LT spice software. 2. Getting started with LT spice software. 3. Design fixed power supplies for ±5 V or ±9V or ±12 V. 4. Design voltage divider circuits by using LT spice software. 5. Design voltage multiplier circuits using LT spice software. 6. Design RC circuits by using LT spice software. 7. Design LPF and HPF by using LT spice software. 8. Design transformer by using LT spice software. 9. Design Half wave rectifier by using LT spice software. 10. Design full wave rectifier by using LT spice software. 11. Design op-amp circuit by using LT spice software.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

Oral examination conducted on the syllabus and term work mentioned above

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
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Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED226	Credits: 1
Course: Engineering Science Course(Electrical Workshop)	Term Work: 25 Marks
Teaching Scheme:	
Practical:2 Hrs/week	

Objectives	:	1. To understand the use of electrical equipment's. 2. Students should be able to repair and maintain the equipment's.
List of Practical	:	**(Any 10 experiments from following list)** 1. To study electrical safety rules and reasons for electrical hazards and accidents. 2. To study electrical safety tools and importance of Earthing. 3. To study different types of switches used for different household applications as per voltage and current rating. 4. To Study Lux Meter and measure the illumination levels for workshop and office. 5. To study and measure temperature with the help of IR Thermometer 6. To perform soldering and mounting of resistors, capacitors, and electronic components on PCB. 7. To measure current and voltage of circuit using digital Multimeter. 8. To study and understand construction and working principle of MCB. 9. To study construction and working of mobile charger. 10. To study construction and working of portable drill machine. 11. To study and understand functioning of electric bell.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

Oral examination conducted on the syllabus and term work mentioned above.

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Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science & Technology)
Syllabus of S. Y. B. Tech.

(All Branches)

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Course Code: BSH-251	Credits: 3-0-0
Course: **Probability and Random Theory**	Mid Semester Examination-I: 15 Marks
	Mid Semester Examination-II: 15 Marks
Teaching Scheme:	Teacher Assessment: 10 Marks
Theory: 03 Hrs/week	Term Work: 00 Marks
Tutorial: 00 Hrs/week	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 03 Hrs

Prerequisite	Students requires sufficient amount of knowledge of certain topics related to probability, random theory and statistics.
Objectives	1. To provide necessary basic concepts of probability, statistics, various discrete and continuous probability distributions and random theory 2. To provide basic ideas of probability, statistics including measures of central tendency, correlation and regression and random processes for applications engineering which can describe real life phenomenon. 3. To help the students develop the ability to solve problems using probability and statistics. 4. To connect probability and statistics to other fields both within and without mathematics.
Unit-I	**Basic Probability** Introduction to probability, Sets, Fields, Events, Theorem of total probability, Conditional probability, independent events, Bayes' theorem, Statistical independence and models of probability. (07Hrs)
Unit-II	**Probability Distribution** Binomial distribution, Poisson distribution and Normal distribution, Evaluation of statistical parameters for these distributions. (05Hrs)

	Statistics-I
Unit-III	Measures of central tendency: Mean Median, Quartiles and Mode. Measures of dispersion: Quartile deviation, Mean deviation, Standard deviation, Coefficient of variation, Moments, Skewness and Kurtosis. (06 Hrs)
Unit- IV	**Statistics-II** Curve fitting: Principle of least squares, Fitting of linear curve, Parabola, exponential curve, correlation and regression. (05 Hrs)
Unit-V	**Random variables** Definition of random variables, discrete and continuous random variables, probability distribution function, density function and cumulative distribution function, Properties of probability and cumulative distribution function. (06Hrs)
Unit-VI	**Sampling Distributions** Definitions of population, sampling, parameters and statistics, Types of sampling, sampling distribution : Chi-square distribution, t distribution, F distribution, Standard error, sampling distribution of mean and sampling distribution of variance (07 Hrs)

	Sr. No.	Title	Author	Publication	Edition
References	12.	Probability and statistics for engineers and scientists	Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye	Pearson Publications.	9th Edition
	13.	Probability and Statistics for Engineers	Miller and Freund's	Pearson Educations	8th Edition
	14.	A First Course in Probability	S. Ross	Pearson Education India, 2002.	6th Edition
	15.	Statistical Method	S. P. Gupta	S. Chand and sons	37th Edition
	16.	Higher Engineering	Dr. B.S. Ramana	Khanna	37th

		Mathematics		Publication	Edition
	17.	A text book of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications	8th Edition
	18.	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley eastern Ltd	10th Edition
	19.	Advanced Engineering Mathematics	C.R. Wylie	McGraw Hill Publications	6th Edition
	20.	Advanced Engineering Mathematics.	H. K. Dass	S.Chand And Co.Ltd	18th Edition
	21.	Applied Mathematics	P. N. Wartikar & J. N. Wartikar	Pune Vidyarthi Griha Prakashan,Pune	9th Edition
	22.	NPTEL, Swyam, edX, Coursera, Khan Academy…etc course related video			

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED252 Course: AC Machines **Teaching Scheme:** Theory: 03 Hrs/week Tutorial: 00 Hr/week	Credits: 3-1-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 03 Hrs
Prerequisite	Electromagnetic Circuits, Magnetic Circuits, Insulating Materials and Conducting Materials, Faraday's Laws, Ampere's Law, Flemings right-hand rule and left-hand rule, amperes thumb rule, Force -Torque (T), Linear Velocity (V) - Angular Velocity (ω), T= k x Φ x I , E = k x Φ x ω.
Objectives	1. To understand the principle of operations of AC Machines 2. To determine different performance indices of AC Machine viz. current, emf and torque based on different loading conditions.
Unit-I	**Three Phase Induction Motors (Part-I):** Constructional features of three phase induction machines, Production of rotating magnetic fields, principle of operation, generated emf, slip, rotor frequency, rotor emf, rotor power, power factor and torque. Torque-Slip/speed characteristics Speed control, No load test, Block Rotor test, Losses and efficiency, Equivalent circuit. (8 Hrs)
Unit-II	**Three Phase Induction Motors (Part-II):** Circle diagram, power factor control of three phase induction motor, starting of three phase IM. cogging and crawling, Applications of poly-phase IM. (4 Hrs)
Unit-III	**Single Phase Induction Motor** Double field revolving theory, Split Phase, Capacitor Start, Capacitor start & run, Shaded Pole, Torque-slip characteristics, Equivalent Circuit, advantages, drawbacks, applications. Comparison of 1-phase induction motor with 3-phase induction motor. (6 Hrs)
Unit-IV	**Synchronous Alternators** Constructional features synchronous machine, Principle of operation, Excitation systems, EMF equation, Hunting, Ratings of Alternators, Armature Reaction, and Vector diagram of alternator, Determination of Voltage Regulation. (8 Hrs)

Unit-V	**Parallel Operation of Alternators** Conditions for parallel operation, Synchronization methods, Load sharing between two alternators in parallel, Alternators in parallel with infinite bus bar, Effect of change in excitation. (4 Hrs)
Unit-VI	**Synchronous Motors** Various starting methods of Synchronous Motor, Power Flow in Synchronous Motor, Power Angle Characteristics, Synchronous Motor Connected to Bus Bar, Operation of 3-phase Synchronous Motor with Constant Excitation & Variable Load, Constant Mechanical Load on its Shaft & Variable Excitation. (6 Hrs)

	Sr. No.	Title	Author	Publication	Edition
References	23.	Electrical Technology by Vol-II	B.L.Theraja	Chand Publication.	
	24.	Principles of Electrical Machines	V.K. Mehta	Chand Publication.	
	25.	Electrical Machines	Ashfaque Hussain	Tata McGraw Hill	
	26.	Electrical Machines	Nagnath Kothari	Tata McGraw Hill	
	27.	Electrical Machines	J.B. Gupta, SK Kataria	Sons Publication	
	28.	Electrical Machinery	P.S.Bhimbhra	Khanna Publications	
	29.	Theory of AC Machines	Alexander Langsdorf	Tata McGraw Hill	
	30.	Principles and practice of Electrical Engineering	Gray Wallance	Int. student Ed.	Eight
	31.	Electrical Machinery	A.E.Fitzgerald, C.Kingsley,	New York, Tata McGraw Hill Edu.2013	
	32.	Performance & Design of Alternating Current Machine.	Say.M.G	CBS Publisher (2002).	

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED-253	Credits: 3-1-0
Course: Signals and Systems	Mid Semester Examination-I: 15 Marks
Teaching Scheme:	Mid Semester Examination-II: 15 Marks
Theory: 03 Hrs/week	Teacher Assessment: 10 Marks
Tutorial: 00 Hr/week	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 03Hrs
Prerequisite	
Objectives	1.To introduce the fundamental concepts and techniques in signals and systems. 2.To be familiarized with techniques suitable for analyzing and synthesizing both continuous-time and discrete time systems.
Unit-I	**Signals** Classification of signals, Representation of signals, Basic operation on signals, Elementary signals, **Systems** Representation and Classification of continuous and discrete time systems, Properties of systems, System Model: Input-Output Description. (6 Hrs)
Unit-II	**System analysis using Z-transform:** Unilateral and Bilateral Z- Transform and its Properties, Region of Convergence, Inversion of Z-Transform, Transform Analysis of LTI systems, Stability and Causality. (6 Hrs)
Unit-III	**Fourier Series Representation of Periodic Signals** Fourier Series Representation, Existence of Fourier Series Trigonometric Fourier Series, Exponential Fourier Series, Fourier Transform and its properties, Transform

	of some useful functions. (8 Hrs)				
Unit-IV	**Discrete time signals in Frequency Domain:** Discrete Time FourierTransform (DTFT), Existence of DTFT, Relation between Z-transform and Fourier Transform and Properties, DTFT spectrum. (6 Hrs)				
Unit-V	**System analysis using Laplace transform:** Unilateral and Bilateral Laplace Transform, Properties of Laplace Transform, Inversion of Laplace Transform, Solving Differential Equations with Initial Conditions and using R,R-C,R-L-C network Transform analysis of LTI systems. (6 Hrs)				
Unit-VI	**State-Space Concept:** Introduction, Definition: State, State variable, State vector and state space, State space representation, Derivation of State model from transfer function. (4 Hrs)				
References	**Sr. No.**	**Title**	**Author**	**Publication**	**Edition**
	1.	Signals and Systems	S. Haykin and B. V. Veen	John Wiley and Sons.	2nd Edition 2007
	2.	Signals and Systems	Alan V. Oppenheim, Alan S. Willsky, with S. Hamid Nawab.	Prentice Hall of India.	2nd Edition 1997
	3.	Signals and Systems: Continuous and Discrete,	R. E. Ziemer, W. H. Tranter and D. R. Fannim,	Prentice-Hall.	4th Edition
	4.	Signals and Systems	A.Anand Kumar	Prentice-Hall of India	3rd Edition

	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
	(Faculty of Science & Technology)
	Syllabus of Syllabus of S. Y. B. Tech. (Electrical Engineering)

Course Code: EE 254	Credits: 3-1-0
Course: Analog Devices and Circuits	Mid Semester Examination-I: 15 Marks
Teaching Scheme:	Mid Semester Examination-II: 15 Marks
Theory: 03 Hrs/week	Teacher Assessment: 10 Marks
Tutorial: 00 Hr/week	Term Work: Nil
	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 3 Hrs

Prerequisite	Students should have the knowledge of the Basic electronics devices, rectifiers and transistors (FET and MOSFET) and operational amplifier.
Objectives	1.To get an overview of circuits of diodes , transistors, power amplifier and low and High frequency responses. 2. To understand & learn the concept of feedback amplifier, operational amplifiers, its applications and oscillators.
Unit-I	**Solid State devices:** Introduction, BJT, FET, MOSFET and IGBT V-I characteristics and Working. (5 Hrs)
Unit-II	**Diode Configurations:** Series diode configurations, Parallel and series –parallel configurations, clippers, Clampers, bridge rectifier, PIV, efficiency, ripple factor. TUF analysis, Ripple Factor calculation for C, L, LC, regulation with and without filter. (6 Hrs)
Unit-III	**Bipolar Junction Transistor (BJTs):** DC biasing– Introduction, operating point, voltage divider Bias configuration , Low frequency Response and High Frequency response BJT Amplifier **Feedback concepts: -** Concept of Feedback Amplifiers, Effect of Negative feedback on the amplifier, Characteristics. (6 Hrs)
Unit-IV	**Oscillator:** Basic principle of Oscillator, Barkhausens Criteria for Sustained Oscillations, Classification of Oscillator, R-C Phase Shift and Wein- Bridge oscillators, tuned oscillators- Collpitts and Hartley; Crystal oscillator. (6 Hrs)

		Amplifiers:
Unit-V		RC coupled and transformer coupled amplifier and multi stage amplifier,
		Applications of Op-Amps:
		Introduction of IC 741 and parameters, Integrator, Differentiator, Comparator, , Voltage to Current and Current to Voltage Converters, Sample and Hold Circuits, Schmitt trigger.
		Active Filters: LPF, HPF, BPF, BEF, All-pass Filters, Higher Order Filters and their Comparison, Switched Capacitance Filters. (7 Hrs)
Unit-VI		**Power Amplifiers:**
		Classification of Power Amplifiers – Class A, Class B and Class AB power Amplifiers, Push Pull Class A and Class B Power Amplifiers. Complementary Push Pull Amplifier with trickle Bias. (6 Hrs)

	Sr. No.	Title	Author	Publication	Edition
References	1.	Electronic Devices and Circuit Theory	Robert L.Boylestad and Louis Nashelsky	PEARSON EDUCATION	10th
	2.	Microelectronic Circuits -Theory and applications	ADEL S. SEDRA and KENNETH C.SMITH	Oxford University Press,2017	7th
	3.	Millman's Integrated Electronics	Jacob Millman, Christos Halkias, Chetan Parikh	McGraw Hill Education, 2017	2nd
	4.	Electronic Circuit Analysis and Design	Donald Neamem,	Tata McGraw-Hill.	2nd
	5.	Electronics devices and circuits	David A. Bell	PHI,1998	2nd

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
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Syllabus of Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-IV	
Course Code: EED291	Credits: 3-1-0
Course: Digital Electronics	Mid Semester Examination-I: 15 Marks
Teaching Scheme:	Mid Semester Examination-II: 15 Marks
Theory: 03 Hrs/week	Teacher Assessment: 10 Marks
Tutorial: 00 Hr/week	Term Work: 25
	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 3 Hrs
Prerequisite	To learn this course student should have the knowledge of the following digital Integrated Circuits and digital logic gates.
Objectives	1. To develop an ability to understand working of different Number systems, logic families and about memory & programmable logics 2. To develop an ability to design and realize combinational and Sequential digital circuits.
Unit-I	**Number system :** Binary, Octal, Decimal and Hexadecimal, and their Conversion methods, Signed Binary number 1's and 2's complement representation, Binary Arithmetic, complement Arithmetic. (4 Hrs)
Unit-II	**Digital circuits minimization techniques:** Revision of logic gates, Boolean Algebra, De-Morgan's theorems, Simplification using Boolean algebra, Standard representation for logical functions, SOP and POS form, Karnaugh map representation and minimization of logical functions up to 4-variables, Don't care conditions. (7 Hrs)
Unit-III	**Combinational Logic Circuits:** Design Examples: full adder and full subs tractor, BCD - to - 7 segment decoder, Code converters: Binary to Gray code converter, Gray to Binary code converter, Digital Comparator, Parity generators, Multiplexers & Demultiplexers and its use in combinational logic designs, decoder, encoder, ALU. (8 Hrs)
Unit-IV	**Sequential Logic Circuits :**

	Bit Memory Cell, Clocked SR, JK, Master Slave J-K flip flop, D and T flip-flops, Excitation Table for flip flops. Conversion of flip flops, Application of Flip flops: Shift Registers, buffer register, modes of operation of shift register, Bidirectional shift register. (7 Hrs)
Unit-V	**Counters:** Types of counters **:** Asynchronous counter, synchronous counter , ripple counter ,up/down counter , modulus counter, ring counter , Jonson counter. (5 Hrs)
Unit-VI	**Characteristics of logic Families** : Characteristics of digital ICs-Speed of operation , power dissipation, figure of merit, fan in, fan out, current and voltage parameters, noise immunity, operating temperatures and power supply requirements, Comparison of logic families(TTL,ECL,CMOS) ,Programmable Logic Array. (5 Hrs)

	Sr. No.	Title	Author	Publication	Edition
References	1.	Digital Logic and Computer Design	M. Marris Mano	PHI, New Delhi,	1st Ed., 2001
	2.	Modern Digital Electronics	R.P.Jain	Tata Mc-Graw hill	Fourth Edition
	3.	Digital Principles and Application	Malvino and Leach	TMH, New Delhi, 1995	4th Edition
	4.	Digital Principles and Design	Donald Givone,	Tata Mc Graw Hill	4th Edition
	5.	Digital Logic Design	Morries Mano,	PHI	4th Edition 2009

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
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Syllabus of Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-IV	
Course Code: EED292	Credits: 3-1-0
Course: Fundamentals of Microprocessor and Microcontroller	Mid Semester Examination-I: 15 Marks
	Mid Semester Examination-II: 15 Marks
Teaching Scheme:	Teacher Assessment: 10 Marks
Theory: 03 Hrs/week	Term Work: 25
Tutorial: 00 Hr/week	End Semester Examination: 60 Marks
	End Semester Examination (Duration): 3 Hrs
Prerequisite	To learn this course student should have the knowledge of LED, digital Integrated Circuits.
Objectives	1. To Study of architecture, instruction set, Programming and applications of microprocessor 8085, 8086 and PIC microcontroller. 2. To study and enhance the knowledge of 8051 Microcontroller.
Unit-I	**Overview to Microprocessor:** Evaluation of Microprocessor, Architecture of 8085, Pin description, addressing modes**,** Instruction set, different programs, Timing diagram. (5 Hrs)
Unit-II	**Microprocessor 8085 & Interfacing:** Different data transfer schemes, Memory mapping, memory mapped I/O and I/O mapped I/ O, Stack & subroutines, Interrupt structure , Introduction to 8255, Switches, Relays, D.C motors, Stepper motor with 8255,ADC, DAC. (7 Hrs)
Unit-III	**Microprocessor 8086:** Architecture of 8086, Pin diagram, Programming model of 8086, Physical addressing, Addressing modes, and overview of instruction set. (6 Hrs)
Unit-IV	**Introduction to 8051 Microcontroller:** Comparison of microprocessor and microcontroller, Evolution, Features of MCS 51 families, 8051 Architecture, pin detail, Instruction set, programming model, addressing modes and i/o ports, Memory organization. (7 Hrs)
Unit-V	**8051 Microcontroller Interfacing:** I/O port programming, interrupts, Timer/ Counter Programming, Serial Communication, Interfacing of LED, LCD ADC, DAC, SPI bus devices, RS232. (7 Hrs)

Unit-VI	**PIC Microcontroller** Concept of RISC & CISC, PIC18 series architectures, features and selection as per application, PIC18F registers, memory Organization, BOD. (4 Hrs)			

	Sr. No.	Title	Author	Publication	Edition
References	1.	Microprocessor, Architecture, Programming and Application	Ramesh Gaonkar	Willey Eastern Ltd,	Fourth Edition
	2.	0000 to 8085	Sridhar Ghosh	Prentice Hall India	4th Ed., 2004
	3.	Fundamentals of Microprocessor and Microcomputer	B. Ram	Dhanpat Rai and Sons New Delhi.	8th Edition
	4.	Advanced Microprocessors and Peripherals	A.K.Ray , K.M.Bhurchandi	Tata McGraw Hill Publications	7th ,2000.
	5.	The 8051 Microcontroller and Embedded Systems	Muhammad Ali Mazidi and Janice Gillispie Mazidi,.	Pearson Education Asia	2nd Edition
	6.	Microcontrollers - Theory and Applications	Ajay V Deshmukh	Tata McGraw – Hill Education, New Delhi	1st Edition 2006
	7.	Design with PIC Microcontrollers	John B. Peatman	Pearson Education	1st Ed., 2002

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED 293 Course: Fundamentals of MATLAB **Teaching Scheme:** Theory: 3 Hrs/week Practical: 1 Hr/week	Credits: 3-1-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 03 Hrs
Prerequisit e	Students should have a good knowledge of mathematical terms, like matrix, array, algebra, numbers, polynomial, differential and integral equations.
Objectives	1. Familiarize with MATLAB programming 2. Solve the differential and Integral equations by using MATLAB programming. 3. Solve the DC analysis by using MATLAB programming. 4. Construct the Electric Circuits by using Simulink blocks.
Unit-I	**Introduction to MATLAB Programming:** Basics of MATLAB programming, Logical operations, Matrix operations, Array operations in MATLAB, working with files: Scripts and Functions, 2D and 3D Graph functions, Plotting and program output. (6 Hrs)
Unit-II	**Control Statements:** FOR loops, IF statements, WHILE statements and INPUT/OUTPUT commands. Errors- Syntax errors, Logic errors and Rounding errors, functions of m-files. (4 Hrs)
Unit-III	**Integration, Differentiation and Fourier analysis:** Differentiation in single variable, higher order differentiation formulae, partial differentials, and Numerical integration, multiple applications of integration formulae and In-Build MATLAB integration functions and Fourier analysis using MATLAB. (7 Hrs)
Unit-IV	**DC analysis:** Nodal Analysis, Loop Analysis, Super position theorem and Thevenin's Theorem and Maximum power transfer. **Transient Analysis:**

	RC Network, RL Network, RLC Network and State space approach.
	(9 Hrs)

Unit-V	**Simulink blocks:**
	Introduction to Simulink blocks, Simscape electrical blocks and interface MATLAB with external hardware blocks. (6 Hrs)

Unit-VI	**Applications of MATLAB:**
	Applications of MATLAB in electrical engineering, Fuzzy logic, and Neural networks. (4 Hrs)

	Sr. No.	**Title**	**Author**	**Publication**	**Edition**
References	1.	Electronics and Circuit Analysis Using MATLAB	John O. Attia	Math works	2nd Ed.
	2.	Applied Numerical Analysis Using MATLAB	Fausett L.V	Pearson Education	2nd Ed.
	3.	Numerical Methods for Engineers	Chapra S.C. and Canale R.P.	McGraw Hill	5th Ed.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad		
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Syllabus of S. Y. B. Tech. (Electrical Engineering)		

Course Code: EED271	Credits: 1
Course: Laboratory of AC Machines	
Teaching Scheme: Practical: 02 Hrs/week	Practical Marks: 25 Marks

Objectives	**:**	To introduce fundamentals of AC Machines.
		To perform various tests on AC Machines.
List of Practical	**:**	**(Any 10 experiments from following list)**
		1. Study of Cut section of 3-phase squirrel cage Induction Motor.
		2. To perform speed reversal of squirrel cage induction motor.
		3. To study Direct Online Starter.
		4. To study Star-Delta Starter.
		5. Speed Control of 3-phase Sq. Cage Induction Motor by VFD Control MMF method.
		6. No Load & Blocked rotor test on SQIM and Speed reversal for the same motor.
		7. Load test on three phase squirrel cage induction motor.
		8. Determination of Squirrel cage induction motor performance from Circle diagram.
		9. Load test on three phase Slip ring induction motor.
		10. Load test on single phase induction motor.
		11. Speed-torque characteristic of single-phase induction motors (split phase type).
		12. Synchronizing of alternators: Lamp Methods and use of Synchroscope.

The assessment of term work shall be done based on the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad		
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Syllabus of S. Y. B. Tech. (Electrical Engineering)		

Course Code: EED272 Course: Laboratory of Signals and Systems	Credits: 1
Teaching Scheme: Practical: 02 Hrs/week	Practical: 25 Marks

Objectives	:	To be familiarized with techniques suitable for analyzing and synthesizing both continuous-time and discrete time systems using MATLAB programming.
List of Practical	:	**List of Practical:** 1. Plotting of continuous time a sine waveform. 2. Plotting of continuous time standard signal waveforms like a.) Unit impulse (b) Unit step (c) Exponential. 3. Plotting of discrete ramp signal waveforms. 4. Program for up-sampling and down-sampling of a signal. 5. Computation of Laplace and inverse Laplace transform. 6. Computation of Z-transform and inverse Z-transform. 7. Verification of any one Z-transform properties. 8. Computation of linear convolution of two signals. 9. Computation of cross correlation of two signals. 10. Finding zeros and poles of a transfer function. 11. Program for Magnitude and Phase response of 1st order system. 12. Program for Magnitude and Phase response of 2ndt order system. 13. Computation of DFT & IDFT of a sequence. 14. Program for obtaining power spectrum density of a signal. 15.Program for finding energy and power of a signal.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
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Syllabus of S. Y. B. Tech. (Electrical Engineering)

Course Code: EED 273 Course: Laboratory of Analog Devices and Circuits **Teaching Scheme:** Practical: 2 Hrs/week	Credits: 1 Practical: 25 Marks

Objectives	:	Familiarization of various Analog circuits through practical approach.
List of Practical	:	**(Any 10 experiments from following list)** 1. To Plot V-I characteristics of LED. 2. To study Zener diode as a regulator. 3. To study and perform a Diode clipping circuits- Single/Double ended. 4. To study and perform Diode clamping Circuits – Positive clamping/negative clamping. 5. To study and perform a practical on Transistor as a switch. 6. Design and implementation of variable voltage regulator using IC 317. 7. Design and implementation of Astable multivibrator. 8. Design and implementation of Monostable multivibrator. 9. Design and implementation of RC phase shift oscillator. 10. To obtain the characteristics of MOSFET (using simulation tool/hardware) 11. To study MOSFET as an amplifier (using Multisim/hardware) 12. To study voltage series feedback amplifier using BJT (using simulation tool/hardware)

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electrical Engineering)	
Course Code: EED274	Credits: 1
Course: Laboratory of Digital Electronics	
	Term Work: 25 Marks
Teaching Scheme:	
Practical: 2 Hrs/week	
Objectives :	Explore knowledge among students about various digital circuits through practical hands on.
List of Practical :	**(Any 10 experiments from following list)**
	1. Study of logic gates, verification by truth table.
	2. Realization of half and full adder using gates.
	3. Realization of half and full substractor using gates.
	4. Implementation of given Boolean function using logic gates in SOP & POS form
	5. Design and realization of Binary to Gray code converter.
	6. Design and realization of Gray to Binary code converter.
	7. Design and implementation of BCD to seven segment decoder.
	8. Study and Verification of multiplexer
	9. Study and Verification of Demultiplexer.
	10. Study and verification of J-K, T and D Flip-flop.
	11. Design and implementation of Asynchronous counter using IC's
	12. Design and implementation of Synchronous counter using IC's

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	
(Faculty of Science & Technology)	
Syllabus of S. Y. B. Tech. (Electronics and Telecommunication Engineering)	
Course Code: EED275	Credits: 1
Course: Fundamentals of Microprocessor and Microcontroller	Term Work: 25 Marks
Teaching Scheme:	
Practical:02 Hrs/week	

Objectives	**:**	Explore knowledge among students about various digital circuits through practical hands on.
List of Practical	**:**	**(Any 10 experiments from following list)** 1. Study of 8085 Microprocessor Kit used in laboratory. 2. Write a program for addition & subtraction of 8 bit numbers. 3. Write a program to multiply and Division two 8- bit numbers. 4. Write a Program to transfer a block of 10 bytes. 5. Write a program to find largest/smallest numbers from the array. 6. Write a program for LED Interfacing. 7. Write a program for addition, subtraction of 8 bit no. using 89C51 microcontroller. 8. Write a program to interface 7 segment display with 89C51. 9. To Study and Interfacing of 8255card with microprocessor 8085. 10. Write a program for multiplication, division of 8 bit no. using 89C51 microcontroller. 11. Write a program for interfacing button, LED, relay & buzzer to PIC18F4550. 12. To study of 8086 Microprocessor Kit used in laboratory. 13. Write a Program to add and Subtract two 16- bit number using 8086. 14. Write a Program to multiplication and division using MUL and DIV.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of S. Y. B. Tech. (Electrical Engineering)		
Course Code: EED 276		Credits: 1
Course: Laboratory of Fundamentals of MATLAB		Term Work: 25 Marks
Teaching Scheme: Practical: 02 Hrs/week		
Objectives	**:**	1. Identify different toolboxes and functions in MATLAB 2. Developing MATLAB programming skills for complex problems. 3. Solve the differential and integral equation by using MATLAB program
List of Practical	**:**	**(Any 10 experiments from following list)** 1. Program for Logical and Relational Operations. 2. Program for Matrix and Inverse matrix operations. 3. Plot 2D and 3D graphs by using MATLAB program. 4. Program to solve the Polynomial equations. 5. Obtain dynamic response of RLC circuit by using MATLAB program. 6. Solve any differential and integral equations by using MATLAB program. 7. Apply Superposition theorem to any electric circuits. 8. Apply Thevenin's theorem to any electric circuits. 9. Perform state space model by using MATLAB program. 10. Introductions to MATLAB Simulink blocks. 11. Train the nodes/networks to do any operations by using nntool toolbox. 12. Explain the fuzzy logic toolbox.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Science & Technology)
Syllabus of S. Y. B. Tech. (All) Semester - IV.

Code No.: **BSH277**
Course : Development of Skills – IV
Teaching Scheme: **Term-work / Practical Assessment: 25 Marks**
                                                        (Online Examination)
Practical : 2 Hrs / Week   **Credits: 1**

Course Objectives	:	1. Students will be able to communicate in English accurately and effectively.
		2. Students will be able to enhance employability skills.
		3. Students will be able to participate in debate and group discussion in English effectively.
		4. Students will be able to enhance verbal ability.
		5. Students will be able to face interview effectively.

	:	**Sr. No.**	**a) Contents**	**Duration** **Hrs**
		Unit-I	**Common Errors in English Communication** • Grammatical • Spelling • Pronunciation	02hrs
		Unit-II	**Enhancing Employability skills** • Job application • Resume / CV • Essay • Reading Comprehension	06 hrs
		Unit-III	**Debate and Group Discussion** • Communication • Body language • Appearance • Knowledge of the topic • Preparation	04 hrs
		Unit-IV	**Verbal Ability** • Synonyms • Antonyms • Idioms and Phrases • One word substitution • Word analogy • Verbal reasoning	04 hrs
		Unit-V	**Presentation Skills** • Body language • Grooming • Group dynamics	02 hrs

			• Preparation: power point, Prezi, vizme, etc.		
	Unit-VI		**Interview Skills** • Body language • Grooming • Preparation		02 hrs

List of Reference Books	**:**		Sr. No.	Title	Author	Publication
			1	Verbal and Non-Verbal Reasoning	R.S. Agrawal	S. Chand Publication
			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	Himalaya Publishing House
			7	Better English Pronunciation	J.D.O'Connor.	Cambridge University Press
			8	Grammar of Spoken and Written English	Dauglas Biber, Geoffrey Leech	Longman
			11	Technical Communication- Principles and Practice	Meenakshi Raman & Sangeeta Sharma	Oxford University Press
			12	A course in Phonetics & Spoken English	J.Sethi ,P.V.Dhamija	PHI publication
			13	Communication Skills for Engineers	Sunita Mishra, C. Murli Krishna	Pearson Education
			14	Soft Skills: Enhancing Employability: Connecting Campus with Corporate	M.S. Rao	I.K. International
			15	Technical Communication A Reader Centred Approach	Paul V. Anderson	Thomson Publication
			16	Grammar of Spoken and Written English	Dauglas Biber, Geoffrey Leech	Longman
			17	Oxford English Grammar	Sydney Greenbaum	Oxford University Press

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Dr. Babasaheb Ambedkar Marathwada University, Aurangabad **(Faculty of Science & Technology)** **Syllabus of S. Y. B. Tech. (Electrical Engineering)**	
Course Code: EED278	Credits: 1
Course: Laboratory of Programming using C++	Term Work: 25 Marks
Teaching Scheme: Practical:2 Hrs/week	

Objectives	:	1. To understand the use of object oriented way of problem solving. 2. To prepare the student to write programs in C++ to solve the problems
List of Practical	:	**(Any 10 experiments from following list)** 1. A] Write a program to swap two numbers. B] Write a Program to Check Whether Number is Even or Odd 2. Write a program to identify for consonant and vowels and print the result. 3. A] Write a program for leap year. B] Write a program to get the factorial of a given number. 4. Write a program to generate Fibonacci series. 5. Write a program to get GCD (Greatest Common Divisor) or HCF (Highest Common Factor) of two numbers. 6. A] Write a program to find the LCM of two numbers. B]Write a C++ program to Reverse an Integer 7. Write a program to find the power of a number with any real number as an exponent. 8. Write a Program to Check Whether a Number is Palindrome or Not. 9. Write a Program to Find All Roots of a Quadratic Equation. 10. Write a program to Passing String to a Function. 11. Write a program to Function Overloading 12. Write a Program to demonstrate the working of pointer. 13. Write a program for Object and Class in C++ Programming. 14. Write a program using constructors.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment

- Performing the experiments in the laboratory

- Oral examination conducted on the syllabus and term work mentioned above.