

S-19 June & 6 July 2012 AC after Circulars from Circular No.84 & onwards - 13 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**CIRCULAR NO. ACAD / NP / S.Y. B.Tech. / Syllabi/87/2012**

It is hereby notified for the information of all concerned that, the Academic Council at its meeting held on 06-07-2012 has accepted the following syllabi in all Braches of **S. Y. B.TECH.** under the Faculty of Engineering & Technology as appended herewith :-

Sr. No.	Revised Syllabi
[1]	Second Year B.Tech. [CIVIL ENGINEERING],
[2]	Second Year B.Tech. [MECHANICAL / PRODUCTION ENGINEERING],
[3]	Second Year B.Tech. [ELECTRONICS & TELECOMMUNICATION ENGINEERING],
[4]	Second Year B.Tech. [COMPUTER SCIENCE & ENGINEERING],
[5]	Second Year B.Tech. [AGRICULTURAL ENGINEERING],
[6]	Second Year B.Tech. [PLASTICS AND POLYMER ENGINEERING],
[7]	Second Year B.Tech. [INSTRUMENTATION & CONTROL ENGINEERING],

This is effective from the academic year 2012-2013 and onwards.

All concerned are requested to note the contents of this circular for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. ACAD/ NP/ S.Y.B.TECH./
2012/19011-33
A.C.S.S. I.No.82

Date:- 31-07-2012.

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Director,
Board of College and
University Development.

Copy forwarded with compliments to :-

- 1] The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.

Copy to :-

- 1] The Controller of Examinations,
- 2] The Superintendent, [Engineering Unit],
- 3] The Superintendent, [Eligibility Unit],
- 4] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

**Dr BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD**



Revised Syllabus of Second Year

B.TECH.

**ELETRONICS &
TELECOMMUNICATION**

EFFECTIVE FROM - 2012-13 & ONWARDS

FACULTY OF ENGINEERING AND TECHNOLOGY

Revised Structure for 2012-13

[Second Year –Electronics and Telecommunication]

Sub No.	SEMESTER-III	Contact Hrs / Week				Examination Scheme							Duration of Theory Exam
	Subject	L	T	P	Total	CT	TH	T A	P	Total	Credits		
BSH201	Mathematics-III	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC202	Electronics Devices and Circuits	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC203	Network and Lines	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC204	Principles of Communication Engineering	3	1	-	4	20	80	-	-	100	4	4 Hrs	
ETC205	Digital System Design	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC206	Data Structure	2	-	-	2	10	40	-	-	50	2	2 Hrs	
ETC221	Lab I: Electronics Devices and Circuits	-	-	2	2	-	-	25	25	50	1		
ETC222	Lab II: Principles of Communication Engineering	-	-	2	2	-	-	25	25	50	1		
ETC223	Lab III: Digital System Design	-	-	2	2	-	-	25	25	50	1		
ETC224	Lab IV: Network and Lines	-	-	2	2	-	-	50	-	50	1		
BSH225	Lab V :Development of Skill-II	-	-	2	2	-	-	50	-	50	1		
	Total of Semester-III	17	5	10	32	110	440	175	75	800	27		
Sub No.	SEMESTER-IV	Contact Hrs / Week				Examination Scheme							Duration of Theory Exam
	Subject	L	T	P	Total	CT	TH	T A	P	Total	Credits		
BSH251	Mathematics-IV	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC252	Integrated Circuits and Application	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC253	Communication Engineering	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC254	Signals and Systems	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC255	Power Devices and Machines	3	1	-	4	20	80	-	-	100	4	3 Hrs	
ETC256	Electromagnetic Engineering	2	-	-	2	10	40	-	-	50	2	2 Hrs	
ETC271	Lab VI: Integrated Circuits and Application	-	-	2	2	-	-	25	25	50	1		
ETC272	Lab VII: Communication Engineering	-	-	2	2	-	-	25	25	50	1		
ETC273	Lab VIII : Signals and Systems	-	-	2	2	-	-	50	-	50	1		
ETC274	Lab IX: Power Devices and Machines	-	-	2	2	-	-	25	25	50	1		
ETC275	LAB X: Department Skills	-	-	2	2	-	-	50	-	50	1		
	Total of Semester IV	17	5	10	32	110	440	175	75	800	27		
	Grand Total of III & IV									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

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Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III	
Code No.: BSH201 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 04	Title: Engineering Mathematics –III Class Test: 20 Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives :	The contents aims to develop the knowledge of the student in the direction of solving the practical problem in the engineering and technology related to differential equation, Fourier Transforms, Statistical techniques Vectors and Probability.
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 form: i) The Cauchy's linear equation. ii) The Legendre's linear equation. Simultaneous differential equations. Application of linear differential equations to: i). Mechanical system. ii). Electrical System iii). Beam and Shafts (15 Hrs)
Unit-II :	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-III :	Statistics: Measures of central tendency: Mean Median, Quartiles and Mode. Measures of dispersion: Quartile deviation, Mean deviation, Standard deviation, coefficient of variation, Moments, Skewness, Kurtosis. (5 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^n Division by t, Change of scale property, Laplace Transform of integral, Laplace Transform of Derivative. Laplace Transform of some special functions: Bessel's function, Periodic function, Error 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, Simultaneous

		differential equation. . (15 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. (10 Hrs)
Unit-VI	:	Probability: Introduction, Probability Distribution: Binomial Distribution, Poisson Distribution, Normal Distribution (5 Hrs)
Reference Books:	:	<ol style="list-style-type: none"> 1. A Text Book Of Applied Mathematics Volume-III BY P.N. Wartikar J.N.Wartikar, Pune Vidyaryhi Griha Prakashan, Ninth edition. 2. Advanced Engineering Mathematics BY H.K.Dass, S.Chand and Co.Ltd, Eighteenth edition. 3. Higher Engineering Mathematics BY Dr.B.S.Grewal, Khanna Publishers, 46th edition. 4. Higher Engineering Mathematics BY B.V.Ramana, Tata McGraw-Hill Publishing Co.Ltd., First edition. 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:

- Minimum ten questions
- Five questions in each section
- 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.
- 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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III	
Code No.: ETC 202 Teaching Scheme: 04 Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 4	Title: Electronics Devices and Circuits Class Test: 20 M Theory Examination (Duration): 3hrs Theory Examination (Marks): 80
Objectives	: Study solid state semiconductor devices in depth along with mathematical modeling of each, operation, characteristics and linear application of each device that plays an important role as a basic building block in electronic field.
Unit-I	: Bipolar Junction Transistor: An overview of different types of BJT s – Small signal and large signal low frequency types, Switching/RF, Heterojunction BJTs types. Peculiarities of these types and their application areas. BJT Biasing and basic amplifier configurations: Need, types of biasing and its analysis, stability factors, bias compensation for different types of biasing circuits for BJT, its mathematical derivation. Bias compensation, thermal resistance (10 Hrs)
Unit-II	: Multistage Amplifier: Concept of frequency response of amplifier, RC coupled amplifier, frequency response of an single stage Common Emitter RC coupled stage, bandwidth, cut off frequency, importance of half power point(3 dB level frequency), effect of emitter bypass capacitor and emitter resistor on frequency response, Multistage amplifiers, frequency response of two stage cascaded CE transistor stage, Types of coupling, Cascaded and Cascade amplifiers.(10 Hrs)
Unit-III	: Hybrid Parameters: Low frequency hybrid parameters, derivation of voltage gain, current gain, input impedance and output impedance. Comparison of hybrid parameters of all configurations (CB, CE, CC). High Frequency hybrid Π parameters, equivalent circuits, f_T , f_β , f_x , relationship between hybrid and $\Pi(\pi)$ parameters, effect of junction capacitance (10 Hrs)
Unit-IV	: Power Amplifiers: Classification of power amplifiers – Class A, Class B, Class AB, An overview and applications of Class C and Class D amplifiers. Class A with resistive load, Transformer coupled class A amplifier, Class B Push-pull, Class AB, Complementary symmetry and Quasi-complementary configurations. Efficiency analyses for Class A transformer coupled amplifier, Class B push-Pull amplifiers, Comparison of efficiencies of other configurations, Noise and distortion in amplifiers, concept of Total Harmonic Distortion (THD). Bootstrapping in complementary symmetry and bias compensation used in push pull amplifiers (10 Hrs)
Unit-V	: Field Effect Transistors: An overview of different types of FETs viz. JFET, MOSFET, MESFET, Peculiarities of these types and their application areas. JFET: JFET construction, Symbol, Basic operation, V-I Characteristics, Transfer Characteristics (Shockley's Equation), Cut-off & Pinch-off voltages.

		Transconductance, Input resistance & Capacitance. Drain to Source resistance, Universal JFET bias curve. Biasing arrangements for JFET – Biasing against device variation, biasing for zero current drift. JFET as voltage controlled current source. JFET data sheet specifications – IDSS, V_p , g_m , r_d , RDS or RD(ON)JFET Amplifiers: CS, CD, CG amplifiers, Their analysis using small signal JFET model. (10 Hrs)
Unit-VI	:	MOSFETs: An overview of following MOSFET types - D-MOSFET, E-MOSFET, and Power MOSFET. N-MOS, p-MOS and CMOS devices. Handling precautions for CMOS devices. D and E-MOSFET characteristics & parameters, non ideal voltage current characteristics viz. Finite output resistance, body effect, sub threshold conduction, breakdown effects and temperature effects. MOSFET Biasing, Introduction to MOSFET as basic VLSI device, Power MOSFET : construction power MOSFET, VMOSFET drive requirement, comparison with power BJT with data sheet specification, thermal resistance, second breakdown, safe operating area, thermal runaway (10 Hrs)
Reference Books:	:	Integrated Electronics Millman and Halkais Electronic Devices and Circuits David Bell Electronic Devices Thomas Floyd Electronic Circuit Analysis and Design Donald Neamen
Additional Reference Books	:	Electronic Devices and Circuits Millman and Halkais Electronic Devices and Circuit Theory Bolystead and Nashelsky

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Code No.: ETC203 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 4	Title: Network & Lines Class Test: 20 Theory Examination (Duration): 3 Hrs Theory Examination (Marks): 80
Objectives	: 1. To study various lumped components of transmission lines and network theorems. 2. To study all components that play an essential role in active and passive networks 3. To become familiar with propagation of signals through lines 4. Understand signal propagation at Radio frequencies
Unit-I	: Basic Circuit Analysis : Voltage and Current laws (KVL/KCL). Network Analysis: Mesh, Super mesh, Node and Super Node analysis. Source transformation and source shifting. Network Theorems: Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorem, Tellegen's Theorem, Substitution theorem, Millers Theorem and its duality theorem. (10 Hrs)
Unit-II	: Frequency Selective Networks: Significance of Quality factor. Series Resonance: Impedance, Phase angle variations with frequency, Voltage and current variation with frequency, Bandwidth, Selectivity. Effect of Rg on BW & Selectivity. Magnification factor. Parallel resonance: Resonant frequency and admittance variation with frequency, Bandwidth and selectivity. General case: Resistance present in both branches. Comparison and applications of series and parallel resonant circuits.(8 Hrs)
Unit-III	: Networks & Filters: Networks: Classifications: Symmetrical and Asymmetrical networks. Properties of two port Network: (i) Symmetrical Networks (T and π only). Z0 and γ in terms of circuit components, open and short circuit parameters , Characteristic impedance of symmetrical networks, Properties of symmetrical networks (ii) Asymmetrical Networks: Image Impedance and Iterative Impedance (L-Section only)Half section (L-section), symmetrical T and Pi section into half section Filters: Filter fundamentals, Pass and stop bands, Characteristic impedance, Constant K low pass filter, Constant K high pass filter, m - derived T section, m - π derived Section, Variation of characteristic impedance over the pass band, Termination with m-derived half section, Band pass filters, Filter circuit design, Filter performance, Composite filters. (14Hrs)
Unit-IV	: Attenuators & Equalizers: Symmetrical and Asymmetrical attenuators, T-type attenuator, π -type attenuator, Lattice attenuator, Bridged T attenuator, L-type attenuator. Equalizer configuration, Inverse network, Two terminal equalizer, Constant

		resistance equalizer, Full series equalizer, Full shunt equalizer, Bridged -T equalizer, Lattice equalizer. (8 Hrs)
Unit-V	:	<p>Transmission Line Theory: Different Types of transmission Lines, Transmission lines and their implications, shapes of different types of transmission lines, (including 300 ohms antenna feeder cable, 75 ohm coaxial cable), Transmission lines as cascade of T section.</p> <p>General solution of transmission lines, The two standard forms for voltage & current of a line terminated by impedance, Physical significance of the equation and infinite line. Meaning of reflection coefficient, Wavelength and velocity propagation.</p> <p>Waveform distortion, Distortion less transmission line, The telephone cable, Inductance loading of telephone cables.</p> <p>Input Impedance of lossless lines, Reflection on a line not terminated by Z_0, Transfer impedance, Reflection factor and reflection loss, T & π section equivalent to lines. (12 Hrs)</p>
Unit-VI	:	<p>The Line at Radio Frequencies: Standing waves & standing wave ration on a line, One eight wave line, The quarter wave line and impedance matching, The half wave line.</p> <p>The circle diagram for dissipation less lines, The smith chart, Application of Smith chart, Conversion from impedance to reflection coefficient and vice-versa.</p> <p>Impedance to admittance conversion and vice versa, Input impedance of a lossless line terminated by impedance.</p> <p>Single Stub matching & Double stub matching. (8 Hrs)</p>
Reference Books:	:	<ol style="list-style-type: none"> 1. Network and Lines by J.D. Ryder, Prentice Hall of India New Delhi, 2003. 2. Network Analysis by M. E. Vanvalkanburg Prentice Hall of India New Delhi, 2005 3. Transmission line and Network Umesh Sinha, Satya Prakashan, 5th Edition
Additional Reference Books	:	<ol style="list-style-type: none"> 1. Ramo, Whineery and Van Duzer: "Fields and Waves in Communication Electronics" John Wiley. 2. M.E. Van Valkenburg, "An Introduction to Modern Network Synthesis", Wiley Eastern 3. W.H. Hayt & Jack E-Kemmerly, "Engineering Circuit analysis" Tata McGraw Hill. 4. Ram Kalyan, Linear Circuits Oxford University Press

Section A: Includes Unit I, II and III;
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Dr. Babasaheb Ambedkar Marathwada University, Aurangabad Department of Electronics and Telecommunication Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III	
Code No.: ETC204 Teaching Scheme: 4Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 04	Title: Principle of Communication Engineering Class Test: 20 Theory Examination (Duration): 3Hrs Theory Examination (Marks): 80
Objectives	: To provide the basics of electronic communication systems including transmitters, receivers, antennas and various modes of propagation of signals. To provide the students with perspectives of different communication systems and further specialized study of audio and video systems.
Unit-I	: Introduction to Electronic Communication: Elements of communication system, types, base band signals and base band transmission, Introduction ,sources of noise, thermal or Johnson noise, short noise partition noise, Low Frequency or flicker noise, For transit noise, noise calculation in resistor ,reactance & amplifier, signal to noise ratio ,noise factor & noise temperature.(10 Hrs)
Unit-II	: Amplitude Modulation: Equation of AM wave, modulation index, average power, effective voltage & current for sinusoidal wave, generation of AM : low level and high level modulation, AM transmitters, AM broadcast transmitters, SSB communication: balance modulators using diode, FETs and IC, suppression techniques.AM Receivers: Types of receivers: Tuned Radio Frequency(TRF) , Super heterodyne, problems in TRF receivers, characteristics of Radio receivers: selectivity, sensitivity, fidelity, image frequency and its rejection, double spotting, AM receivers: RF amplifiers, mixer stage, tracking, local oscillator, Intermediate Frequency amplifier, AM detectors, distortions in AM detectors, Automatics gain control: simple and delayed AGC. (10 Hrs)
Unit-III	: Angle Modulation: FM theory, characteristics of FM: modulation index, deviation ratio, frequency spectrum, bandwidth requirement, percentage modulation, FM modulators: FET reactance modulators, Transistor reactance modulators, FM with varactor diode, pre emphasis, de emphasis, Automatic frequency control, Introduction to phase modulation: indirect method of FM modulation, wide band and narrow band transmission. Advantages and disadvantages of FM transmission, comparison of AM and FM transmission. Case study:-1. Visit to FM broadcast station 98.3 Radio FM channel / All India radio.(10 Hrs)
Unit-IV	: FM Receiver: Various stages of FM receiver , RF amplifier, Mixer ,IF amplifier, limiters, , use of AGC & double limiting, FM demodulator ,slope detector, balance slope detector, foster Seeley discriminator, ratio detector, Quadrature detector, comparison of FM detection ,noise triangle in FM ,capture effect. Case study:-1. Testing performance of FM applying signal from TV.(9 Hrs)
Unit-V	: Radiation & propagation: Propagation of radio wave propagation, ground wave, sky wave line of side

		propagation, duct propagation tropospheric scattering, line of sight propagation, antenna: concept of radiation & basic antenna system, radiation pattern of antenna, major lobes, minor lobes and beam width, directional antenna system. .(10 Hrs)
Unit-VI	:	Audio Communication: Microphone types: moving coil, ribbon type, condenser and carbon type, characteristics, response parameters, Loudspeaker: types: moving coil cone, Electrodynamic, horn type, characteristics, enclosures and baffles necessity and types, hi-fi system, stereophony, tone control circuits, recent trends in sound recording. Enclosures and baffles, Necessity and types, hi-fi system, stereophony, tone control circuits, (10 Hrs)
Reference Books:	:	Principle of communication Engineering , George Kennedy, Tata McGraw Hill, Principle of communication Engineering, Roody Coolen, Tata McGraw Hill, Audio & Video Systems, R.G.Gupta
Additional Reference Books	:	Communication systems, B.P.Lathi

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Dr.Babasaheb Ambedkar Marathwada University, Aurangabad (Department of Electronics and Telecommunication) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III	
Code No.: ETC205 Teaching Scheme: 4Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 04	Title: Digital System Design Class Test: 20 Theory Examination (Duration): 3 Hrs Theory Examination (Marks): 80
Objectives	: 1) To study the properties & representation of discrete & continuous signals. 2) To study the sampling process & analysis and synthesis of signals. 3) To study the analysis of discrete system using z-transform
Unit-I	: a)Logic families : Parameter definition : noise margin, power dissipation, voltage and current parameter, propagation delay, typical values for TTL,CMOS and ECL,input/output profile for TTL & CMOS,TTL logic families-standard TTL,totem-pole, open collector, tri-state (concept & application) significance of TTL sub families & MOS families ,PMOS NMOS (inverter only) CMOS (Inverter AND & NOR) TTL-CMOS/CMOS-TTL interfacing comparison of TTL & CMOS. TTL compatible high speed CMOS series. b) Number system and Boolean Algebra : Number system, basic gates , universal gates, and their truth tables, postulates of Boolean Algebra , De-Morgan's theorem, binary number system, binary arithmetic, octal number system, hexadecimal number system 1's and 2's complement, excess-3 gray code, alphanumeric code, EBCDIC,ASCII , Error detection & correction, parity. (10 Hrs)
Unit-II	: Combination circuit design : Minterm & max term representation of logical function, K-map minimization using k-map, don't care condition, Quine Mcclusky method for minimization, example – Binary half and full adders, and subtractor , BCD to seven segment decoder, binary to gray and gray to binary conversion. Combinational logic design using MSI circuit : Multiplexers, cascading of multiplexers, introduction to general purpose 74-series ICS, Demultiplexers, binary and BCD adder, parallel adder , digital comparator, BCD to seven segment decoder, parity generation & checking (IC74180), look ahead carry generator, study of ALU 74181 (10 Hrs)
Unit-III	: Sequential Logic design: 1-bit memory cell, Clocked S-R Flip Flop (FF), JK Flip-flop, T – Type Flip flop D-Type Flip flop, Excitation table for all Flip flops, Application of all flip flops, tristate device. Introduction to one bit memory, registers, shift register, universal register, application of shift register as ring counter, twisted ring counter, introduction to general purpose 74 series of ICs. (10 Hrs)
Unit-IV	: Counter: Ripple or asynchronous counter, modulus of counter, introduction to general purpose 74/54 series. Asynchronous ICs , cascading of ripple counter ICs, Synchronous counter, design principals, UP/DOWN counter , Introduction to general purpose 54/74 series synchronous ICs (10 Hrs)
Unit-V	: A) Introduction to microprocessor:

		Overview of Microprocessor structure and its operation, Microprocessor Evolution and its Types B) Microprocessor 8085: Pin Diagram, Architecture, addressing modes, timing diagram (10 Hrs)
Unit-VI	:	Microprocessor 8085: Instruction sets, programming techniques, Counters and Time delays, stack and subroutines interrupt structure and Code Conversion. (10 Hrs)
Reference Books:	:	Modern Digital Electronics : R.P. Jain Digital Theory and logic design : Malvino leach Switching Theory and logic design : Hill and Peterson Digital circuit and system : Douglas hall Digital integrated Electronics : Taub- schilling Digital Logic and computer design : Morries Mono.
Additional Reference Books	:	1) Microprocessor, Architechture programming and application , Ramesh gaonkar 2) 0000 to 8085 , Shridhar Ghosh 3) Fundamentals of Microprocessor and Microcomputer, by B.Ram

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

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Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III	
Code No.: ETC206 Teaching Scheme:2 hrs / Week Theory: 02 Hrs/week Practical: 01 Hrs/week Credits:2	Title: Data Structure Class Test: 10 Theory Examination (Duration): 2 Hrs Theory Examination (Marks): 40
Objectives	: The students shall learn the C language and pointers in depth. They will be able to use pointers for data manipulation. They will learn linear data structures.
Unit-I	: Introduction to Data structures & Analysis of Algorithms Introduction to Data Structures: Concept of data, Data object, Data structure, Abstract Data Types (ADT), realization of ADT in 'C'. Concept of Primitive and non primitive, linear and Non-linear, static and dynamic, persistent and ephemeral data structures. (5 Hrs)
Unit-II	: Searching and sorting techniques Need of searching and sorting, why various methods of searching and sorting, Sorting methods: Linear and binary search. Sorting methods : Bubble, insertion, selection, merge, quick, bucket, Time complexity of each searching and sorting algorithm. (5 Hrs)
Unit-III	: Linear data structures using sequential organization Concept of sequential organization, Concept of Linear data structures, Concept of ordered list, Storage representations of ordered list such as row major, column major and their address calculation. (5 Hrs)
Unit-IV	: Linear data structures using linked organization Concept of linked organization, singly linked list, doubly linked list, circular linked list. Linked list as ADT. Concept of stack as ADT, Implementation of stacks using linked and sequential organization. (5 Hrs)
Unit-V	: Stack and queues Concept of queues as ADT, Implementation of linear and circular queue using linked and sequential organization. Concept of multiqueues, Stacks (5 Hrs)
Unit-VI	: Tree and Graphs Difference in linear and non-linear data structure, Trees and binary trees-concept and terminology. Binary tree as an ADT.B+ Tree and AVL Tree. Graph as an ADT.(5 Hrs)
Reference Books:	: 1. R. Gilberg, B. Forouzan, "Data Structures: A pseudo code approach with C", Cenage Learning, ISBN 9788131503140. 2.Samirkumar bandhopadhay ,Kashnath Dey,"Data structures using C",Pearson publication 3.A.K.Sharma ,"Data structures using C" Pearson publication,ISBN 978-81-317-5566-2 4. Yashwant Kanitkar,"Let us C & Pointer in C",BPB Publication
Additional Reference Books	: 1. Kernighan and Ritchie, "The C Programming Language", Prentice Hall 2. Tremblay and Sorenson, "An introduction to data structures with applications", Tata McGrawHill, Second Edition

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 40 marks Paper:

- Minimum eight questions
- Four questions in each section
- 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 six marks each. The Question no.1 and 6 should be of objective nature.

Two questions of 7 marks each from remaining questions from each section A and B be asked to solve

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III									
Code No.: ETC221 Teaching Scheme: 02Hrs/week Practical: 25M	Lab I: Title: Electronic Devices and Circuits Teachers Assessment: 25M Credits: 1								
Course Objectives	: To study the practical aspects of semiconductor devices and circuits								
List of Practicals (Not Less than 10)	: <ol style="list-style-type: none"> 1. Input, output and transfer characteristics of CE, CB, CC configuration. 2. Comparison of CB, CE and CC configuration in terms of h parameters. 3. To plot frequency responses of CE amplifier with and without emitter bypass resistor & capacitor. 4. To plot DC load line and derive Stability factor of voltage divider biasing circuit. 5. To plot frequency response of Class A, B push pull power amplifier. 6. To plot frequency response of Class C power amplifier. 7. Drain characteristics and transfer characteristics of JFET. 8. To find A_v, R_i, and R_o of Common source JFET amplifier. 9. JFET biasing arrangement and plotting dc load line. 10. Drain characteristics and transfer characteristics of MOSFET. 11. Design test, simulate and build CE transistor circuit using circuit maker. 12. Design test, simulate and build CS FET, MOSFET circuit using circuit maker. 								
List of Reference Books	: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Integrated Electronics</td> <td>Millman and Halkais</td> </tr> <tr> <td>Electronic Devices and Circuits</td> <td>David Bell</td> </tr> <tr> <td>Electronic Devices</td> <td>Thomas Floyd</td> </tr> <tr> <td>Electronic Circuit Analysis and Design</td> <td>Donald Neamem</td> </tr> </table>	Integrated Electronics	Millman and Halkais	Electronic Devices and Circuits	David Bell	Electronic Devices	Thomas Floyd	Electronic Circuit Analysis and Design	Donald Neamem
Integrated Electronics	Millman and Halkais								
Electronic Devices and Circuits	David Bell								
Electronic Devices	Thomas Floyd								
Electronic Circuit Analysis and Design	Donald Neamem								
List of Equipments /Instruments	: Function Generator, Cathode Ray Oscilloscope, Regulated Power Supply, Digital Multimeter, and experimental boards								

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

The assessment of practical examination shall be on the following criteria:

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 (Department of Electronics and Telecommunication) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III	
Code No.: ETC222 Teaching Scheme: 2 Hrs/week Practical: 25M	Lab II: Title: Principles Communication Engineering Teachers Assessment: 25M Credits: 01
Course Objectives	: Students shall find employment in areas of R and D, production, servicing and maintenance of various communication systems. The students should understand the advantage and limitations of various analog modulation systems on a comparative a scale and relate to them while studying practical communication systems.
List of Practicals (Not Less than 10)	: <ol style="list-style-type: none"> 1. To obtain Amplitude modulated Envelop and determine depth of modulation 2. To detect the AM waveform using AM diode detector .measure & observe its distortion. 3. To obtain Frequency modulated wave using voltage controlled oscillator and FET reactance modulator and measure modulation depth. 4. Generation of single side band signal using balanced modulator. 5. Demodulation of SSB Using product detector. 6. To generate a FM Signal and measure Depth of modulation. 7. To plot S curve of balance slope detector & foster seeley discriminator or phase discriminator in FM Demodulator, find maximum useful frequency. 8. To Study Super heterodyne AM receiver and measurement of receiver parameters viz. sensitivity, selectivity & fidelity. 9. To study various types of Micro phones & Loudspeakers. 10. To Plot frequency response of typical tone control circuit. (Bass boost & cut , Treble boost & cut). 11. MATLAB Programs for, <ul style="list-style-type: none"> • Signal generation. • Noise effect on signal. • AM generation. • FM generation • Modeling of random signals
List of Reference Books	: Principle of communication Engineering , George Kennedy, Tata McGraw Hill, Principle of communication Engineering, Rooddy Coolen, Tata McGraw Hill, Audio & Video Systems, R.G.Gupta
List of Equipments /Instruments	: Experimental kits, Cathode Ray Oscilloscope, Digital storage Oscilloscope, Function Generator, Connecting wires, CRO Probes, Power supplies.

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.

The assessment of practical examination shall be on the following criteria:

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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III	
Code No.: ETC223 Teaching Scheme: 02 Hrs/week Practical: 25M	Lab III: Title: Digital System Design Teachers Assessment: 25M Credits: 1
Course Objectives	: 1) To study the properties & representation of discrete & continuous signals. 2) To study the sampling process & analysis and synthesis of signals. 3) To study the analysis of discrete system using z-transform
List of Practicals (Not Less than 10)	: 1) Study of logic gates, verification by truth table. 2) Realization of half and full adder using gates. 3) Realization of subtractors using gates. 4) BCD adder using binary adder. 5) Design and realization of code converter. 6) Study of multiplexer and demultiplexer. 7) Study of S-R, J,-K, T and D Flip-flop. 8) Design and implementation of 4 bit up and down counter using master slave JK flip flop and study of 7490,7492,74193 and other relate chips. 9) Shift registers implementation using Master slave JK flip-flop, study of 74192 and other related chips. 10) Study of BCD to seven segment decoder. 11) Study of 8085 Microprocessor Kit used in Laboratory. 12) Write a program to transfer a block of 10 bytes. 13) Write a program to add 8-bit and 16-bit number using 8085. 14) Write a program to subtract two 8-bit and 16-bit number using 8085. 15) Write a program to multiply two 8-bit numbers.
List of Reference Books	: Modern Digital Electronics : R.P. Jain Digital Theory and logic design : Malvino leach Switching Theory and logic design : Hill and Peterson Digital circuit and system : Douglas hall Digital integrated Electronics : Taub- schilling Digital Logic and computer Design: Morries Mono. Microprocessor, Architechture programming and application , Ramesh gaonkar 0000 to 8085 , Shridhar Ghosh Fundamentals of Microprocessor and Microcomputer, B.Ram
List of Equipments /Instruments	: D.E. Kits, CRO, Microprocessor kits,

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.

The assessment of practical examination shall be on the following criteria:

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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III	
Code No.: ETC224 Teaching Scheme: : 02 Hrs/week	Lab IV: Title: Network and Lines Teachers Assessment: 50M Credits: 1
Course Objectives	: <ul style="list-style-type: none"> • Introduction of Basic Designing of Electronics & basic laws of Networks & Lines • To understand the scope of the different fields of Network Theory as well as Lines. • To study different case studies & Designing basic circuits of electronics for better understanding the subject
List of Practicals (Not Less than 10)	: <ol style="list-style-type: none"> 1. To verify Superposition Theorem. 2. To Verify Reciprocity Theorem 3. To Verify Thevenins and Nortan's Theorem. 4. To verify Maximum Power Transfer Theorem. 5.To Verify Tellegen Theorem 6. Frequency response of Series Resonance circuit. 7. Frequency response of Parallel Resonance circuit. 8. Frequency response of Low Pass Filter, High Pass Filter, 9.Frequency response of Band Pass Filter, Band Stop Filter. 10. Measurement of SWR of transmission lines. 11 Measurement of transmission lines parameters, characteristics impedance of lossless and lossy line. 12. Measurement of impedance using single stub (smith chart) 13. Case study on theorem. 14 Hobby -Mini project on any one topic of above list.
List of Reference Books	: <ol style="list-style-type: none"> 1. Network and Lines by J.D. Ryder, Prentice Hall of India New Delhi, 2003. 2. Network Analysis by M. E. Vanvankanburg Prentice Hall of India New Delhi,2005 3. Transmission line and Network Umesh Sinha Satya Prakashan5th Edition
List of Equipments /Instruments	: Experimental kits, Cathode Ray Oscilloscope, Function Generator, Connecting wires, CRO Probes, Power supplies.

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

<p align="center">Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester- III</p>	
<p>Code No.: BSH225</p>	
<p>Teaching Scheme:(02) Hours per week</p>	
<p>Practical: 02 Hours per week</p>	
<p>Credits:01</p>	
<p>Lab V:</p>	
<p>Title: DOS- II</p>	
<p>Termwork :50 marks</p>	
<p>Practical :--</p>	
<p>Total Examination (Marks): 50 marks</p>	
Course Objectives	: Students should adequately equip to face the highly competitive and very demanding corporate world of today. Soft skills encompass personal, social, communication, and self-management behaviors. They cover a wide spectrum of abilities and traits: being self-aware, trustworthiness, conscientiousness, adaptability, critical thinking, attitude, initiative, empathy, confidence, integrity, self-control, organizational awareness.
Unit-I	Soft skills and Functional English. Basic of soft skills Dimensions of soft skills, Misconception of soft skills. The changing business environment and its impact on soft skills, Presentation: Preparation, delivery, etc. Interview technique ,Group Discussion and Debate 5 hrs
Unit-II	Nonverbal Communication. And Corporate etiquettes. Body Language and its different aspects, Voice dynamics and voice modulation, Professional Appearance, Clothing etiquettes and Corporate dressing, Dinning table etiquettes. etc. 06 hrs
Unit-III	Business Correspondence Official Drafting: Letter writing, Inquiry, Request, Complain, Sales, Follow-up. etc. Office documents like circulars, notices, minutes, agenda and memos. Report Writings: Types of reports, Data Interpretation: Compréhension of data, Analyses and Interprétations of data 06 hrs
Unit-IV	E-communication Email communication and Email etiquettes ,Video Conferencing, and other e-communication 04 hrs
Unit-V	Team work and team building The elements of teamwork. The changing nature of team .The basics of team intelligence, Diversity awareness, Gender issues, what is an effective team? Essential building blocks of essential team. 04hrs

Unit-VI	<p>Problem-Solving and self confidence</p> <p>Collaborative problem-solving, Benefits of collaboration, Effective Conflict Communication, Conflict resolution styles, Defusing conflict, Evaluating the conflict, How to build confidence, How confident are you? Thinking like a confident person. 5Hrs</p>
List of Reference Books	<ol style="list-style-type: none"> 1. Gopaldaswamy Ramesh, Mahadevan Ramesh, "The Ace of soft skills" Pearson publications. 2. <u>Jerry Weissman</u> ,"Presenting to Win", Prentice Hall publications. 3. William Sanborn Pfeiffer,T.V.S.Padmaja, "Technical communication" Pearson publications. 4. "Presentation Skills for Managers"Mcgraw Hills brief case books. 5 .Personality Development and soft skills,Oxford University Press 6 Technical Report Writing Today: Daniel G. Riordan, Steven E. Pauley 7 Technical Writing: B. N. Basu 8 David Lawrence Preston,"365 steps of self confidence", Published by How To Books Ltd,

The term work shall be done on the ten assignments based on the topics mentioned above .And oral examination would be conducted internally on the syllabus mentioned.

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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester- IV	
Code No.: BSH251 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits: 04	Title: Engineering Mathematics -IV Class Test: 20 M Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80
Objectives	: The contents aims to develop the knowledge of the student in the direction of solving the practical problem in the engineering and technology related to Function of complex variable, transforms, Numerical Methods, Vectors.
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 Taylor's and Laurent's series(without proof), Singularities, Residues, Cauchy's residue theorem. . (15 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. (5 Hrs)
Unit-III	: Vector Integration: Line integral, Surface integral, Gauss divergent theorem, Stoke's theorem, Green's theorem, Curvilinear coordinates: Cylindrical and Spherical polar coordinates. (10 Hrs)
Unit-IV	: 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), ii. One dimensional heat flow (The diffusion equation) iii. Two dimensional heat flow.(The Laplace equation) (10 Hrs)
Unit-V	: Z- transform : Definition, Z-transform of elementary function , properties of Z-transform , Inverse Z-transform :Partial fraction method, inversion integral method(Residue method),Solution of Difference equation by using Z-transform. (8 Hrs)
Unit-VI	: Numerical Method: Solution of algebraic and transcendental equation, Newton Raphson method, Lagrange's interpolation, Solution of linear simultaneous equation; by Gauss elimination method, The Guass-seidal method,Solution of ordinary differential equations: Taylor series method, Fourth order Runge-Kutta method. (12 Hrs)

Reference Books:	:	<ol style="list-style-type: none">1. A Text Book of Applied Mathematics Volume-II –by P.N. Wartikar and J.N.Wartikar.2. A Text Book Of Applied Mathematics Volume-III-by P.N. Wartikar and J.N.Wartikar.3. Advanced Engineering Mathematics-by H.K.Dass.4. Higher Engineering Mathematics- by Khanna Publishers.5. Higher Engineering Mathematics- by B.V.Ramana.
Additional Reference Books	:	<ol style="list-style-type: none">1. 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:

- Minimum ten questions
- Five questions in each section
- 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.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

<p align="center">Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of Second Year B. Tech. (Electronics and Telecommunication) Semester-IV</p>	
<p>Code No.: ETC 252 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits:4</p>	
<p align="right">Title: Integrated Circuits and Applications Class Test: 20 M Theory Examination (Duration): 3 hrs Theory Examination (Marks): 80 M</p>	
Objectives	The physical world is inherently analog, indicating analog circuitry is needed to conditioning physical signals from transducers and then process and control it for various applications
Unit-I	: Feedback Amplifiers And Oscillators: Concept of feedback, Negative and positive feedback. Classification of amplifiers based on feedback topology, (Voltage, Current, Transconductance and Transresistance amplifiers). Transfer gain with feedback. Advantaged and disadvantages of negative feedback, Effect of feedback on input and output impedances and bandwidth of an amplifier, Analysis of one circuit for each feedback topology, Oscillators: Oscillator startup mechanism, barkausen criteria, need for amplitude limiting. Study of following oscillator circuits (using FET and BJT), LC oscillators, Hartely, colpitt, clap, crystal, RC phase shift oscillator. (10 Hrs)
Unit-II	: Time base generator circuits: General features of time base signal, transistorized miller and boot strap time base voltage and current sweep generators, UJT saw tooth sweep generator, errors in sweep speed generation, and linear wave shaping circuits clipping, clamping, multiplier and multi vibrator circuits using transistors. (10 Hrs)
Unit-III	: Op- Amplifier Fundamentals: Basic building blocks of op-amplifier, Op-amplifier parameters: frequency response, fast settling time, offset nulling techniques, inverting and non inverting configuration. Ideal characteristics on Op-amp, Linear Application of op-amplifier: Summing amplifier, difference amplifier, instrumentation amplifier, voltage to current converter with floating load and grounded load, current to voltage converter, integrator, differentiator & its application, comparator, limitation of op-amp as comparator, Schmitt trigger, comparator IC such as LM339, bandwidth and slew rate limitation, precision rectifiers and peak detector. (10 Hrs)
Unit-IV	: Non Linear Applications and phase lock loops: Introduction to Log, Antilog amplifiers, Analog & trans conductance multipliers, Analog to Digital and digital to analog conversion techniques, sample and hold circuit, precision half wave & full wave rectifier, instrumentation amplifier, Phase lock loop IC 565 operating principle, locking capture range, applications of PLL : FM detector, FSK demodulator, Frequency synthesizer, AM detector. Voltage to Frequency converter, frequency to voltage, converter .Multi vibrators IC 555 based astable & mono stable multi vibrators, monolithic waveform generators IC 566 function generators. (10 Hrs)
Unit-V	: Active Filters Design:

		Transfer Function, first order low pass active filters, standard second order low pass and high pass butter worth filters, KRC filters, multiple feedback filters, state variable and bi quad filters, band pass, band reject, all pass filters and its sensitivity analysis, active filter performance considerations, switched capacitor filters(first and second order) (10 Hrs)
Unit-VI	:	Power Conversion: Blocks of Regulated power supply, load regulation , line regulation, types of voltage regulators: series & shunt regulators, Zener as shunt regulator, transistor shunt regulator, transistor series regulator, protection circuits in regulators: overload & short circuit protection causes and remedies, IC regulators Fixed, variable, adjustable positive & negative voltage regulators using LM317,723, 78XX, 79XX Series. (10 Hrs)
Reference Books:	:	Integrated Circuits K.R Botkar Op Amps and Linear Integrated Circuits Ramakant Gayakwad Operational Amplifier G.B Clayton
Additional Reference Books	:	Operational Amplifier Linear Integrated Circuits Coughlin, Driscoll Design with operational Amplifiers and Analog Integrated circuits Sergio Franco

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:

- Minimum ten questions
- Five questions in each section
- 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.
- 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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester- IV	
Code No.: ETC253 Teaching Scheme: 04Hrs/week Theory: 03Hrs/week Tutorial: 01Hr/week Credits:4	Title: Communication Engineering Class Test: 20 Theory Examination (Duration): 3hr Theory Examination (Marks): 80
Objectives	: To understand the technique of telecommunication transmission and reception used in today's world.
Unit-I	: Evolution of Simple Telephone Communication: Stronger switching, signaling tones, step by step switching, crossbar switching, cross bar switch technology, cross bar exchange, electronic space division switch. (9 Hrs)
Unit-II	: Traffic Engineering: Network traffic load and parameters, Erlang, grade of service and blocking probability, modeling switching system, incoming traffic and service time characterization, blocking models and loss estimates, delay. (11 Hrs)
Unit-III	: Telephone Networks: Switching hierarchy and routing, transmission system, numbering plan, signaling techniques, charging plan Tutorial: subscriber loop system. (10 Hrs)
Unit-IV	: Analog Pulse Modulation: Sampling Theorem for Low – pass – proof with spectrum, Aliasing. Sampling Techniques – principle, generation, demodulation, spectrum. PAM, PWM, PPM – generation and detection.. (10 Hrs)
Unit-V	: Television System and Standards: Scanning process, video signal, aspect ratio, persistence of vision and flicker, vertical resolution, kell factor horizontal resolution and video bandwidth, interlaced scan, CCD image sensors, Block schematic and functional requirement of color television receivers . (13 Hrs)
Unit-VI	: Color TV system and displays: DTH broadcast satellite system, HDTV, Types of displays: LED,LCD, Plasma Case Study: CATV. (7 Hrs)
Reference Books:	: Principles of Telephony N.N Biswas Telecommunication Switching System and Networks :Thiagarajan Viswanathan Television Engineering :A.M Dhake Color Television :Gulati

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:

- Minimum ten questions
- Five questions in each section
- 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.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

<p style="text-align: center;">Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Department of Electronics and Telecommunication) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV</p>	
<p>Code No.:ETC254 Teaching Scheme: 4Hrs/week Theory: 03Hrs/week Tutorial: 01Hrs/week Credits:04</p>	
<p style="text-align: right;">Title: Signals and Systems Class Test: 20 M Theory Examination (Duration):3 Hrs Theory Examination (Marks): 80</p>	
Objectives	: 1) To study the properties & representation of discrete & continuous signals. 2) To study the sampling process & analysis and synthesis of signals. 3) To study the analysis of discrete system using z-transform
Unit-I	: Introduction to signals & systems Signal: Definition of signals, classification of signals, continuous & discrete time, analog & digital signals, deterministic-non deterministic, periodic-non periodic, even- odd, energy-power, multichannel, multidimensional signals, representation of signals, standard test signals, operations on signals Systems: definition of system, classification of systems, Linear-nonlinear, time variant-time invariant, casual-non causal, static –dynamic, stability of system. (10 Hrs)
Unit-II	: System Analysis : Introduction to LTI systems, block diagram , system Interconnections, convolution of continuous time signals(CT) & convolution of discrete time signals (DT), Properties of convolution , correlation of continuous time signals(CT) & discrete time signals (DT) signals, Properties of auto correlation & cross correlation. Sampling: Representation of continuous –time signals by its samples, The sampling theorem, Nyquist rate, Nyquist interval, Reconstruction of signals from interpolation formula, Effect of under sampling: Aliasing, Discrete time processing of continuous time signals. (10 Hrs)
Unit-III	: Transform Techniques Fourier Fourier Series: Fourier series representation of periodic signals. Representation of Fourier series, continuous time periodic signals, properties of Fourier series, Dirichlets conditions, Trigonometric Fourier series & exponential Fourier series , complex Fourier spectrum Fourier Transform : Deriving Fourier transform from Fourier series , Fourier transform of arbitrary signals , Fourier transform of standard signals, Fourier transform of periodic signals , properties of Fourier transform (10 Hrs)
Unit-IV	: Z transform Basic principal of z-transform, z-transform definition, region of convergence, properties of ROC, properties of z transform, poles & zeros. Inverse z-transform by power series method, partial fraction expansion method, relation between z-transform & Fourier transform. (10 Hrs)
Unit-V	: Solution of Linear constant co-efficient difference equation Difference equation solving methods: direct method, homogeneous solution, particular solution & total solution, Impulse response of LTI system. Indirect Method: one sided z-transform, properties of one sided z-transform, analysis of LTI system by z- transform. 10 Hrs)

Unit-VI	:	Correlation, energy spectral density and power spectral density : Introduction-correlation and correlogram, the correlation function : conceptual basis, energy signals, power signals, auto-correlation : relation to the signal energy and signal power, properties of auto-correlation, cross correlation : properties of cross co relation , correlation of Fourier series, energy spectral density: Definition and derivation of ESD, effect of system on ESD, The ESD concept ,relation of ESD to Auto correlation, power spectral density : definition and derivation of PSD, effect of System on PSD, the PSD concept, relation of PSD to auto correlation, sampling theorem and its proof , effect of under sampling, sampling of band pass signals. (10 Hrs)
Reference Books:	:	Simon haykins and barry vans veen."Signals and systems ", 2 nd Edition,Wiley india. Simon haykins," Introduction to Analog and Digital Communication ",Wliey india.
Additional Reference Books	:	<ol style="list-style-type: none"> 1. Communication Systems, B.P.Lathi 2. Signals ,Systems and transforms , Charles Phillips 3. Probability, Random variables, random processes, Peyton peebles 4. Digital Signal Processing ,principals.Algorithms and Application, John G. Proakis and Dimitris G. Monolakis. 5. Signals And Systems Analysis using transform method and MATLAB, M.J.Roberts. 6. Signals And Systems, K.Lindner 7. Digital Signal Processing, Moman H. Hays 8. Analog and Digital Signal processing, Ashok Amhardar.

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:

- Minimum ten questions
- Five questions in each section
- 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.
- 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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV	
Code No.: ETC255 Teaching Scheme: 4 hrs / Week Theory: 03Hrs/week Tutorial: 01Hrs/week Credits: 4	Title: Power Devices & Machines Class Test: 20 Theory Examination (Duration): 3 Hrs Theory Examination (Marks): 80
Objectives	: 1. This subject provides fundamental knowledge of power electronics systems which are commonly used in industries as well as in electrical transmission systems. 2. To study various basic AC and DC machines: construction, operation, characteristics, losses and advantages disadvantages
Unit-I	: Introduction to Thyristor Family: DIAC, TRIAC, SCR, IGBT, GTO, Power BJT, Power, MOSFET Construction, Operation, Static characteristics, Switching characteristics, Forward and reverse bias, Safe Operating Area, mounting techniques, Case Study on technical specifications & basic electrical characteristics. (10 Hrs)
Unit-II	: Thyristor Triggering & Commutation Circuits: Basic aspects, R-C triggering, Anode triggering, UJT relaxation oscillator, Digital processor based triggering scheme, design aspects of triggering circuits, and Natural & forced commutation circuits. Thyristor protection, steady state & transient protection, snubber circuits, Heat sink Design, analytical aspects & performance parameters Case study on Heat sink designing. (10 Hrs)
Unit-III	: Power Converters AC to DC: Single phase half Wave, full wave & semi converter with R-L loads, effect of freewheeling diodes, P.F. improvement, dual converter, Cyclo-: Basic concept, classification, single & three phase circuits, AC to AC: AC voltage controller, Single phase with R-L Load & Three phase with R load. DC to DC :(Choppers) Basic concept, classification, step up & step down, design for source filter, Applications & performance parameters, DC to AC : (Inverter) Basic concept, classification, single phase & three phase circuits, voltage control techniques (10 Hrs)
Unit-IV	: D.C. MACHINE : Generator : Shunt & Series-Operating principal, Construction, EMF equation, Methods of excitation, Armature reaction and Commutation, Characteristics, Losses, application, Numerical, Concept of Compound Power stages, Efficiency Motor: Shunt & Series-Back EMF, EMF Equation, Torque equation, Characteristics, Starting and Speed control, application, Numerical Power stages, Efficiency, Concept of Compound (10 Hrs)

Unit-V		AC MACHINE Induction Motor: Three phase Induction Motor-Operating principle, Construction, Squirrel cage and Slip ring type, Torque equation, Torque-slip Characteristics, Power stages, Speed control, Starting Methods ,efficiency, (10 Hrs)
Unit-VI	:	Special Purpose Motors: Single phase Induction Motor- Construction, Double field revolving theory, Torque/Speed Characteristics, Types –Capacitor start, Capacitor start-capacitor run, Shaded pole, split phase. Single phase AC Series Motors& their applications Special Machines: Universal Motor, Stepper motor, Types ,Variable reluctance, Permanent Magnet, Hybrid Type, Characteristics& ,Servomotors, A.C./D.C. Types Applications. applications, Advantages & Disadvantages, Limitations, Important Definitions (10 Hrs)
Reference Books:	:	<ol style="list-style-type: none"> 1. Power Electronics—M Rashid (Pearson Publication.) 2. Power Electronics –DR. R .S. Bhimbra (Khanna Publication) 3. Power Electronics –P C Sen (PHI) 4. Thyristor & their Application- M. Ramamurthy (PHI) 5. Electrical Machines-- Nagraath Kothari--- TMH). 6. Electrical Technology Vol.I & II B.L.Theraja Vol.I&II-- S.Chand 7. ABC of electrical Engineering -- B.L.Theraja--- S.Chand 8. Electrical Technology--- H.Cotton---Pitman & Sons London)
Additional Reference Books	:	<ol style="list-style-type: none"> 1. Power Electronics—M Rashid (Pearson Publication.) 2. Electrical Engineering---Mittal 3. Power Devices-S.D.Valunjar, Saraswati Prakashan

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:

- Minimum ten questions
- Five questions in each section
- 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.
- 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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV	
Code No.: ETC256 Teaching Scheme: Theory: 02Hrs/week Tutorial: 01Hrs/week Credits:2	Title: Electromagnetic Engineering Class Test: (10) Theory Examination (Duration): 2Hrs Theory Examination (Marks): 40
Objectives	: The mathematical knowledge is essential for propagation of electromagnetic waves and radiation from a current element start from the use of wave equation and spherical coordinate system which require vector analysis and coordinate system
Unit-I	: Vector analysis & Electrostatics: Vector algebra, Coordinate system: The Cartesian Coordinate system Circular Cylindrical Coordinates, Spherical Coordinate System, Coulomb's Law, Electric Field Intensity, Field of Point ,n point Charges, Field due to a continuous Volume Charge Distribution, a Line Charge Field ,infinite line charge, a Sheet of Charge, infinite sheet charge having uniform charge density , Gauss's Law, Diversion Theorem, Maxwell's First Equation. (5 Hrs)
Unit-II	: Energy and potential: Energy Expended in Moving a Point Charge in an Electric Field, The Line Integral, Definition of Potential Difference and Potential, The Potential Field of a Point Charge, The Potential Field of a System Charges: Conservative Property, Potential Gradient, The Dipole, Energy Density in the Electrostatics Field.(5 Hrs)
Unit-III	: Current, Conductors, Dielectrics, Capacitance: Current and Current Density, Continuity of Current, Metallic Conductors, Conductor Properties and Boundary Conditions, The Nature of Dielectric Materials Boundary conditions for perfect Dielectric Materials, (5 Hrs)
Unit-IV	: The steady magnetic field: Biot-Savart Law, Ampere's circuital Law, Curl , Stokes's Theorem, Magnetic Flux and Magnetic flux Density, Scalar and Magnetic Potentials, Derivation of steady magnetic- Field Laws (5 Hrs)
Unit-V	: Time varying fields and Maxwell's equation: Faraday's Law, Displacement Current, Maxwell's Equation in Point Form and Maxwell's, Equations in Integral Form-Static Field, Free Space, Good Conductor and Harmonically Varying Field , The Poynting Theorem .(5 Hrs)
Unit-VI	: Electromagnetic waves: Wave equation for all field, Wave Motion in free space, Wave Motion in Perfect Dielectrics, Plane Wave in Lossy Dielectrics, Propagation in Good Conductor: Skin Effect, Reflection of Uniform Plane Waves, Standing-Wave Ratio, Wave Impedance and Polarization, Power Flow and Energy Stored. (5 Hrs)

Reference Books:	:	1) Electromagnetic Engineering -- W.H .Hayt --- McGraw Hill. 2) Fundamental of Electromagnetic --M.A. Wazed Miah -- TMH 3) Basic Electromagnetic with application -- N. Narayanrao --- PHI 4) Time harmonic field --- R.F Harrington ---Pitman & Sons London)
Additional Reference Books	:	Field theory of guided Waves --- R.E. Collin

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 40 marks Paper:

- Minimum eight questions
- Four questions in each section
- 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 six marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 7 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV							
Code No.: ETC271	Lab VI:						
Teaching Scheme: 02hrs/week	Title: Integrated Circuits and Applications						
Practical: 25M	Teachers Assessment: 25M						
	Credits: 1						
Course Objectives	To design, build and test the applications of real world						
List of Practicals (Not Less than 10)	<ol style="list-style-type: none"> 1. Voltage and Current Series Feedback Amplifier 2. Voltage and Current Shunt Feedback Amplifier 3. Op-Amp application as inverting and non inverting amplifier 4. Op- amp as Integrator and Differentiator amplifier 5. Op-Amp as Schmitt Trigger and Comparator 6. Op-Amp as an Phase Lock Loop amplifier 7. Design and build Precision Half way and Full way Rectifier 8. Multivibrator IC 555 application as astable and mono stable multi vibrator 9. Voltage to Frequency and frequency to voltage convertors 10. Regulated Power supplies using fixed and variable ICs. 11. Instrumentation amplifier. 12. Analog to digital converter. 						
List of Reference Books	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">Integrated Circuits</td> <td>K.R Botkar</td> </tr> <tr> <td>Op Amps and Linear Integrated Circuits</td> <td>Ramakant Gayakwad</td> </tr> <tr> <td>Operational Amplifier</td> <td>G.B Clayton</td> </tr> </table>	Integrated Circuits	K.R Botkar	Op Amps and Linear Integrated Circuits	Ramakant Gayakwad	Operational Amplifier	G.B Clayton
Integrated Circuits	K.R Botkar						
Op Amps and Linear Integrated Circuits	Ramakant Gayakwad						
Operational Amplifier	G.B Clayton						
List of Equipments /Instruments	Function Generator, Cathode Ray Oscilloscope, Regulated Power Supply, Digital Multimeter, and experimental boards						

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

The assessment of practical examination shall be on the following criteria:

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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV	
Code No.: ETC272 Teaching Scheme: 02hrs/week Practical: 25M	Lab VII: Title: Communication Engineering Teachers Assessment: 25M Credits: 1
Course Objectives	: To understand various concepts of Telecommunication & Television Engineering.
List of Practicals (Not Less than 10)	: <ol style="list-style-type: none"> 1) Study & prove sampling theorem. 2) To study & perform PAM. 3) To study & perform PWM. 4) To study & perform PPM. 5) To study various blocks of monochrome television & test the waveforms at test points. 6) To study various blocks of colour television. 7) To study video pattern generator. 8) To study DTMF telephone trainer & its ringer circuit. 9) To study detail circuit description of system control section. 10) To study the fault simulation & step-by-step fault finding in s television. 11) To study IC CD7698(colour IF subsystem) 12) To study TDA 3561A(PAL colour decoder) 13) To study functioning & working of rotary dial telephone. 14) Visit to telephone exchange & report on same.
List of Reference Books	: <ol style="list-style-type: none"> 1. Telecommunication Switching System and Networks :Thiagarajan Viswanathan 2. Television Engineering :A.M Dhake 3. Color Television , Gulati
List of Equipments /Instruments	: <ol style="list-style-type: none"> 1)CRO 2)DSO 3) Function generator. 4) Power supply. 5)Television 6) Landline connection. 7) Different kits as listed above.

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

The assessment of practical examination shall be on the following criteria:

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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV	
Lab VIII: Title: Signals & Systems Teachers Assessment: 50M Credits: 1	
Code No.: ETC273 Teaching Scheme: 02hrs/week	
Course Objectives	: 1) To study the properties & representation of discrete & continuous signals. 2) To study the sampling process & analysis and synthesis of signals. 3) To study the analysis of discrete system using z-transform
List of Practicals (Not Less than 10)	: 1) Study of different commands of MATLAB used for signals & systems. 2) Program to calculate convolution of two sequences by using basic MATLAB operators and by using 'conv' command. 3) Program to calculate cross correlation and Autocorrelation by using basic MATLAB operators and by using 'xcorr' Command. 4) Program to calculate 'N' Point DFT of a sequence. 5) Program to plot Magnitude and phase Response of second order System. 6) Program to find out poles and zeros of a transfer function 7) Program to plot magnitude and phase response of first order System. 8) Any one Application of Simulink. 9) Program for GUI 10) Program for down/up sampling. 11) Program for basic signal generation (sine wave). 12) Write a matlab program to plot the following Continuous time signals $X(t) = 5 \sin(2\pi f t)$, where $f = 50$ hz. 13) Write a matlab program to plot the following Discrete time signal $Y(n) = 5 \sin(2\pi n)$ 14) Write matlab program for finding the signal energy OR power of the signal $X_1(t) = \text{tri}((t-3)/10)$ Where tri is triangular signal 15) Design of simple LTI system using simulink. 16) Write matlab based program to compute power spectrum Density. 17) Matlab based program for verification of sampling theorem. 18) Matlab based program for generation of basic C.T. signal. 19) Matlab based program to show properties of Impulse signal. 20) Matlab based program to show relationship between C.T & D.T. fourier transform of a signal.
List of Reference Books	: 1. Simon haykins and Barry Van Veen. "Signals and systems", 2. 2 nd Edition, Wiley india. Simon haykins, " Introduction to Analog and Digital Communication ", Wiley india.
List of software	: Pentium(R) , matlab -10 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 (Faculty of Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV Lab IX: Title: Power Devices & Machines Teachers Assessment:25M Credits: 1	
Code No.: ETC274 Teaching Scheme: 02hrs/week Practical : 25M	
Course Objectives	: This subject provides fundamental knowledge of power electronics systems & Electrical Machines which are commonly used in industries as well as in electrical transmission systems
List of Practicals (Minimum 10)	: <ol style="list-style-type: none"> 1.To plot V-I Characteristics of SCR/DIAC/TRIAC/IGBT/MOSFET 2. To study SCR Triggering, Commutation circuits and observes the output. 3. To study Single phase controlled rectifier on various loads and observe the output. 4. To study chopper and observe the output. 5. To study inverter and observe the output. 6. To perform speed control of DC motor. 7.Reversal of speed for DC Motors 8.To study DC motor starters 9. Reversal of speed of Three phase Induction motor. 10.To Study of operation of Single phase Capacitor start Induction motor 11.To Study of various stepper motor 12.To Study of operation of Single phase Capacitor start-capacitor run Induction motor
List of Reference Books	<ol style="list-style-type: none"> 1. Power Electronics—M Rashid (Pearson Publication.) 2. Power Electronics –DR. R .S. Bhimbra (Khanna Publication) 3. Power Electronics –P C Sen (PHI) 4. Thyristor & their Application- M. Ramamurthy (PHI) 5. Electrical Machines-- Nagraath Kothari--- TMH). 6. Electrical Technology Vol.I & II B.L.Theraja Vol.I&II-- S.Chand 7. ABC of electrical Engineering -- B.L.Theraja--- S.Chand 8. Electrical Technology--- H.Cotton---Pitman & Sons London)
List of Equipments /Instruments	<ol style="list-style-type: none"> 1. Power Scope 2.Function Generator 3.Power Supply 4.SCR

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

1. Continuous assessment
2. Performing the experiment in the Laboratory
3. Oral examination (conducted internally) on the syllabus and the term work mentioned above

The assessment of practical examination shall be on the following criteria:

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 Engineering & Technology) Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV	
Code No.: ETC275 Teaching Scheme: 02hrs/week	Lab X: Title: Department Skills Teachers Assessment: 50M Credits: 1
Course Objectives	: To study software used in electronics and making printed Circuit Boards
List of Practicals (Minimum 10)	: <ol style="list-style-type: none"> 1. Study of various types Passive and Active components. 2. Study of various types of switches, connectors, relays. 3. Study of various types of PCB, layout and artwork techniques. 4. Circuit simulation using P-spice/ ORCAD. 5. Circuit simulation using matlab. 6. To study tool box of LAB view. 7. To study different windows of lab-view. 8. To draw different signals in lab view. 9. Circuit simulation using Labview. 10. Mini project.
List of Reference Books	The Printed Circuits Handbook by Coombs Introduction to PSpice using OrCAD for circuits and Electronics, 3 rd edition, Rashid Matlab its Application in Engineering, Bansal / Goel/Sharma, Pearson. Introduction to Matlab 7 ,Etter, Pearson Labview 2009 student edition, by National Instrument Mastering MATLAB 7,Hanselman,Pearson
List of Equipments /Instruments	Components, software: p-spice, Matlab, Labview

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

1. Continuous assessment
2. Performing the experiment in the Laboratory
3. Oral examination (conducted internally) on the syllabus and the term work mentioned above