Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,

AURANGABAD

Revised Syllabus of SE (EC/ETC/E&C/IE)

Effective from 2017-18

Part-I

Sub Code	Semester-I	Contact Hrs/Week				Examination Scheme						Duration of Theory Examination
	Subject	**L**	**T**	**P**	**Total**	**CT**	**TH**	**TW**	**PR**	**Total**	**credits**	
BSH201	Engineering Mathematics -III	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC202	Electronic Devices & Circuits	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC203	Analog Communication Engineering	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC204	Network Analysis	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC205	Data Structure and Linux	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC221	Lab 1: Electronic Devices & Circuits	--	--	2	2	--	--	--	50	50	**1**	
ETC222	Lab 2: Analog Communication Engineering	--	--	2	2	--	--	--	50	50	**1**	
ETC223	Lab 3: Network Analysis	--	--	2	2	--	--	--	50	50	**1**	
ETC224	Lab 4: Data Structure and Linux	--	--	2	2	--	--	50	--	50	**1**	
ETC225	Lab 5: Electronic Workshop - I	--	--	4	4	--	--	50	--	50	**2**	
	Total	**20**	**--**	**12**	**32**	**100**	**400**	**100**	**150**	**750**	**26**	

L: Lecture hours per week

T: Tutorial hours per week

CT: Class Test

TW: Term Work

TH: University Theory Examination

P: Practical hours per week

PR: Practical/Oral Examination

With effect from Academic Year: 2017-18
Part-II

Sub Code	Semester-II	Contact Hrs/Week				Examination Scheme						Duration of Theory Examination
	Subject	**L**	**T**	**P**	**Total**	**CT**	**TH**	**TW**	**PR**	**Total**	**credits**	
BSH251	Engineering Mathematics-IV	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC252	High Speed Analog Devices	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC253	Digital Logic Design	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC254	Signals and Systems	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC255	Electrical Machines and Instruments	4	--	--	4	20	80	--	--	100	**4**	**3 Hrs**
ETC271	Lab 6: High Speed Analog Devices	--	--	2	2	--	--	50	--	50	**1**	
ETC272	Lab 7: Digital Logic Design	--	--	2	2	--	--	--	50	50	**1**	
ETC273	Lab 8: Signals and Systems	--	--	2	2	--	--	--	50	50	**1**	
ETC274	Lab 9: Electrical Machines and Instruments	--	--	2	2	--	--	50	--	50	**1**	
BSH275	Lab 10:Communication Skills- I	--	--	4	4	--	--	50	--	50	**2**	
	Total	**20**	--	**12**	**32**	**100**	**400**	**150**	**100**	**750**	**26**	

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L: Lecture hours per week

T: Tutorial hours per week

CT: Class Test

TW: Term Work

TH: University Theory Examination

P: Practical hours per week

PR: Practical/Oral Examination

BSH 201: Engineering Mathematics -III

Teaching scheme		**Examination scheme**	
Theory	: 4 hrs / week	Theory Examination	: 80 Marks (3hrs)
Credit	: 4	Class Test	: 20 Marks

Objectives:

- To develop Logical understanding of the subject.
- To develop mathematical skill so that students are able to apply mathematical methods & Principle's in solving problems from Engineering fields.
- To produce graduates with mathematical knowledge & computational skill.

Unit 1: Linear Differential Equations **[8 hrs.]**

Linear Differential Equations with constant coefficients General method, shortcut methods to find particular integral, Homogenous Linear differential equations (Cauchy's & Legendre's form), method of variation of parameters.

Unit 2: Application of Linear Differential Equations **[6 hrs.]**

Application of Linear Differential Equations to Electrical circuits & to Mechanical system (Analogous study of two systems), to Civil Engineering, Free oscillations/vibrations, forced oscillation /vibrations, Damped Free oscillations / vibrations, Damped Forced oscillations / vibrations.

Unit 3: Fourier Transform **[6 hrs.]**

Fourier Transform, Fourier sine and cosine transform, Fourier integral, Fourier sine and cosine integral.

Unit 4: Statistics & Probability **[8 hrs.]**

Measures of central Tendency and Measures of Dispersion (for grouped data only), Karl Pearson's coefficient of skewness, Probability distribution for random variables, Binomial and Normal distributions Regression and Correlation.

Unit 5: Vector Differentiation **[6 hrs.]**

Differentiation of vectors, Gradient of scalar point function, Directional derivative, Divergence of vector point function, Curl of a vector point function. Irrotational and solenoidal vector field.

Unit 6: Vector Calculus (Integral calculus) **[6 hrs.]**

The line integral, Surface integral, volume integral, Gauss Divergence theorem, Stoke's theorem, Green's theorem (All theorem without proof).

Note:

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Text Books:

1. P. N. Wartikar and J. N. Wartikar, "A Text Book of Engineering Mathematics" (Volume-I, II,III) Pune Vidyarthi Griha Prakashan, Pune.
2. B. S. Grewal, "Higher Engineering Mathematics," Khanna Publications, New Delhi.
3. H. K. Das, "Advanced Engineering Mathematics ," S. Chand & Company.

Reference Books:

1. B.V. Ramana, "Higher Engineering Mathematics," (Tata McGraw- Hill).
2. Erwin Kreyszig **,** **"**Advanced Engineering Mathematics," Wiley Eastern Ltd.
3. Ravish R Singh, Mukul Bhat, "Engineering Mathematics," A Tutorial Approach, Mc Graw Hill
4. S.C Gupta and V.K Kapoor, "Fundamentals of Mathematical Statistics, S. Chand and Sons

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6). Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 and 6 be made compulsory and should have at least EIGHT bits of two marks out of which FIVE to be solved.
4. Two questions from remaining questions from each section be asked to solve having weightage of 15 marks.

ETC202: Electronics Devices and Circuits

Teaching scheme		**Examination scheme**	
Theory	: 4 hrs. / week	Theory Examination	:80 Marks (3hrs)
Credit	: 4	Class Test	: 20 Marks

Objectives:

- Lectures present the principles of circuit analysis and design and basic concepts and characteristics of the electronic devices and circuits.
- Laboratory work has been developed to give the student practice in the experimental setup, measurement, and analysis of basic electronic devices and circuits.
- The course as a whole outlines some ways of thinking about analog circuits that hopefully will help to develop intuition. By the end of this subject, students should have acquired reasonable proficiency in the analysis and design of basic electronic circuits.

Unit-1: Semiconductor Diodes [5 hrs]

Semiconductor basics, Band structure of P N junction, PN Junction diode construction & working, Volt-amp characteristics, Diode current equation, Temperature dependence of V-I characteristics, Transition and Diffusion capacitance of P N junction , Zener and Avalanche Breakdown.

Diode Application: Half wave, Full wave and Bridge rectifiers, Types of Filters, Ripple factor, Clippers & Clampers (unbiased).

Unit-2: Bipolar Junction Transistor [8 hrs]

BJT: construction, working, characteristics, Transistor as switch, Transistor configurations, current gain equation, stability factor.

BJT Biasing and basic amplifier configurations: Need for biasing BJT, Transistor biasing methods, Transistor as amplifier , Analysis of Single Stage Amplifier, RC coupled Amplifiers, Effects of bypass and coupling capacitors, Frequency response of CE amplifier, Emitter follower, Cascaded Amplifier, Need for multistage amplifiers and suitability of CE, CC and CB configurations in multistage amplifiers.

Power amplifiers: Introduction, classification of power amplifiers -A, B, AB, C and D, transformer coupled class A amplifier, Class B push pull and complementary symmetry amplifier, efficiency, calculation of power output, power dissipation, cross over distortion and its elimination methods, need of heat sink and its design.

Unit-3: Junction Field Effect Transistor and MOSFET [7 hrs]

JFET: JFET and its characteristics, Pinch off voltage, Drain saturation current, JFET amplifiers, CS,CD,CG amplifiers ,their analysis using small signal JFET model ,Biasing the FET, The FET as VVR.

MOSFET: Overview of DMOSFET, EMOSFET, Power MOSFET, n MOSFET, p - MOSFET and CMOS devices, Handling precautions of CMOS devices, MOSFET as an Amplifier and Switch, Biasing in MOSFET, Small signal operation and models, Single stage MOS amplifier, MOSFET capacitances, CMOS Inverter, Comparison of FET with MOSFET and BJT w.r.t. to device and Circuit parameter.

Unit-4: Wave Shaping Circuits & Multivibrator [6 hrs]

Integrator and differentiator using passive components and their response for sine wave, square wave input.

Multivibrators: Monostable, Astable, Bistable, Collector coupled and emitter coupled, a fixed bias and self-bias transistors binary, commutating capacitors, symmetrical and asymmetrical triggering, Schmitt trigger.

Unit-5: Feedback and Oscillators: [8 hrs]

Principle of Negative feedback in electronic circuits, Voltage series, Voltage shunt, Current series, Current shunt types of Negative feedback, Typical transistor circuits effects of Negative feedback on Input and Output impedance, Voltage and Current gains, Bandwidth, Noise and Distortion. Principle of Positive feedback, Concept of Stability in electronics circuits, Barkhausen criteria for oscillation, RC, Clapp, Wien Bridge, Colpitt, Hartley, Tuned LC, UJT, Relaxation Oscillators.

Unit-6: Voltage Multiplier & Regulator Circuits [6 hrs]

Voltage multiplier circuits: Working and comparison of voltage doubler, tripler and voltage quadrupler configurations, Limitations of voltage multiplier circuits.

Transistor application: Discrete transistor voltage Regulation, series voltage regulator, shunt voltage regulator.

IC Voltage Regulators: Three terminal voltage regulator, Variable voltage regulator

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Text Books:

1. Electronics Devices and Circuit Theory, Robert, L. Boylestad, Louis Nashelsky, (Tenth Edition) Pearson Education, Inc.

2. Milliman's Electronics Devices and Circuits, Jacob Milliman, Christos C Halkias, Satyabrata Jit (Third Edition), Tata McGraw Hill.

3. "Electronics Devices and Circuits" David A. Bell,(Fifth Edition),Oxford Press.

4. "Basic VLSI Design" Pucknell, Kamran, (Third Edition), PHI.

Reference Books:

1. “Electronics Devices and Circuits” Allen Mothershead.

2. “Electronics Devices and Circuits” Dharma Raj Cheruka and B. T. Krishna, Pearson Education.

3. “Microelectronics Circuits” A.S. Sedra and K.C.Smith, (Fifth edition), Oxford University Press (India)

Section A: Unit 1, 2, 3.

Section B: Unit 4, 5, 6.

PATTERN OF QUESTION PAPER

Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.

For 80 Marks papers:

1. Minimum 10 questions

2. Five questions in each section

3. Question no.1 from section A and question no.6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.

4. Two questions from remaining questions from each section A and B

ETC203: Analog Communication Engineering

Teaching scheme		Examination scheme	
Theory	: 4 hrs. / week	Theory Examination	: 80 Marks (3hrs)
Credit	: 4	Class Test	: 20 Marks

Objectives:

To introduce the concepts of analog communication systems, and to equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance.

Unit -1: Introduction to Communication System [06 hrs]

Block schematic of communication system, Simplex and duplex systems, Modes of communication: Broadcast and point to point communication, Necessity of modulation, Classification of modulation, sampling theorem and pulse analog modulation, multiplexing: TDM, FMD.

Unit -2: Amplitude Modulation [08 hrs]

Amplitude Modulation: Introduction, Mathematical analysis and expression for AM, Modulation index, Frequency spectrum and bandwidth of AM, Power calculations, Generation of AM using nonlinear property, Low and high level modulation, Balance Modulator.

Types of AM: DSB-FC, DSB-SC, SSB-SC, ISB and VSB, their generation methods and comparison.

Unit -3: Angle Modulation [06 hrs]

Introduction, Mathematical analysis of FM and PM, Modulation index for FM and PM, Frequency spectrum and bandwidth of FM, Narrow band and wide band FM, Direct and indirect methods of FM generation, Pre emphasis and de-emphasis, Comparison of AM, FM and PM.

Unit -4: Radio Receivers and Demodulators [10 hrs]

Introduction, Performances characteristic of receivers: Sensitivity, Selectivity, Fidelity, Image frequency and IFRR, Tracking and Double spotting, TRF, Super heterodyne receivers, RF amplifier, Local oscillator and mixer, IF amplifier, AGC.

AM Detectors: Envelop detector and practical diode detector.

FM Detectors: Slope detector, phase discriminator and ratio detector.

Unit -5: Noise [04 hrs]

Introduction, Sources of noise, Classification of noise, Noise calculations (thermal noise), SNR, Noise figure, Noise Factor, Noise Temperature.

Unit -6: Radiation and Wave Propagation **[06 hrs]**

Radiation: Introduction, Basic Antenna system, Antenna parameters, Di – pole antennas, Yagi Uda antenna.

Wave propagation: Ground wave, sky wave, space wave, Troposphere scatter, Extra-terrestrial propagation.

Ionosphere: Structure, properties of layers of Ionosphere, critical frequency, MUF, skip distance and virtual height.

Text Books:

1. Kennedy & Devis, "Electronic Communication System" Tata Mc Graw Hill

Reference Books:

1. Anokh Singh, "Principles of communication engineering" S.Chand
2. Roddy & Coolen, "Electronic communication" PHI
3. Taub & Schilling "Principles of communication systems" Tata Mc Graw Hill

Section A: Unit 1, 2, 3.

Section B: Unit 4, 5, 6.

PATTERN OF QUESTION PAPER

Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.

For 80 Marks papers:

1. Minimum 10 questions
2. Five questions in each section
3. Question no.1 from section A and question no.6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B

ETC204: Network Analysis

Teaching scheme		Examination scheme	
Theory	: 4 hrs / week	Theory Examination	: 80 Marks (3hrs)
Credit	: 4	Class Test	: 20 Marks

Objectives:

- To prepare the students to have a basic knowledge in the analysis of Electric Networks.
- To solve the given circuit with various theorems and methods.
- To analyze the various three phase circuits: star and delta connections.
- To distinguish between tie set and cut set methods for solving various circuits.
- To relate various two port parameters and transform them.

Unit-1: Basic Concepts [8 hrs.]

Source transformation, source shifting, Nodal and mesh analysis, Mutual inductances, Basic equilibrium equations, Matrix approach for complicated networks. Super mesh, super mode analysis Star–Delta transformation.

Unit-2: Network Topology [6 hrs.]

Graph of network, Concept of a tree and co-tree, incidence matrix, Tie-set & cut-set schedules, formation of equilibrium equations in Matrix form, solution of resistive networks, principles of duality.

Unit-3: Frequency Selective Networks [8 hrs.]

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.

Unit-4: Network Theorems [6 hrs.]

Superposition theorem, reciprocity theorem, Thevenin's theorem, Norton's theorem, Milliaman's theorem, Max. power transfer theorem, Substitution theorem, Compensation theorem, Tellegen's theorems.

Unit-5: Two-port Network [6 hrs.]

Open circuit impedance parameters, short circuit admittance parameters, Transmission parameters, Inverse transmission parameters-Hybrid and inverse hybrid parameters. interrelationship between the parameters-two port symmetry interconnection of two port networks, input impedance in terms of two-port parameters output impedance - image impedance.

Unit-6: Filters **[6 hrs]**

Parameters of a filter, Decibel and neper, propagation constant, classification of filters, basic filter network, cut-off frequencies, constant K-filters, M-Derived filters.

Types of Transmission lines, Transmission Line Equation, Equivalent circuits, Primary and Secondary line constants.

Text Books :

1. M.E. Van Valkenburg: Network Analysis, PHI

2. D. Roy Choudhary: Network and systems, New Age Publication

3. Linear Network Theory: Kelkar and Pandit, Pratibha Publications.

Reference Books:

1. Circuit Theory: Chakrabarti , Dhanpat Rai

2. Engineering Circuit Analysis: Hayt W.H. & J.E. Kemmerly , TMH

3. Network analysis with Applications: William D Stanley, Pearson Education

4. Network analysis: G.K. Mittal, Khanna Publication

5. Umesh Sinha, Transmission Lines and Networks, Satya Prakashan, New Delhi.

Section A: Unit 1, 2, 3.

Section B: Unit 4, 5, 6.

PATTERN OF QUESTION PAPER

Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.

For 80 Marks papers:

1. Minimum 10 questions

2. Five questions in each section

3. Question no.1 from section A and question no.6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.

4. Two questions from remaining questions from each section A and B

ETC205: Data Structure & Linux

Teaching scheme		**Examination scheme**	
Theory	: 4 hrs / week	Theory Examination: 80 Marks (3hrs)	
Credit	: 4	Class Test	: 20 Marks

Objectives:

1. To define high level of abstraction of the needed linear data structure.
2. To develop the ability to synthesize and analyze algorithms
3. To study the representation, implementation and applications of linear & non-linear data structures.
4. To learn and implement fundamentals of programming language using C on windows as well as on Linux .
5. To learn fundamentals of Linux.

Unit-1: Introduction to Data Structures [05 hrs]

Definition, Classification of data structures: primitive and non-primitive Operations on data structures Arrays, One dimensional, two dimensional array, Abstract data type, Array as an ADT, Operations on array. Pointers: Basic concept, Declaring and initializing pointers, Static and dynamic memory allocation, Memory allocation. Functions: malloc, calloc, free and realloc, Recursion: Concept, recursive functions

Unit-2: Linear Data Structures [09 hrs]

Stack : Definition, Array & linked list representation of stack, Operations on stack , Applications of stacks, Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix, Postfix expression evaluation , Queue : Definition, Array & linked list representation of queue, Types of queue: Simple queue, circular queue, double ended queue (deque), priority queue, Operations on all types of Queues.

Linked List: Definition, Components of linked list, Representation of linked list, Advantages and Disadvantages of linked list. Types of linked list : Singly linked list, Doubly linked list, Circular linked list and circular doubly linked list, Operations on singly linked list : creation, insertion, deletion, search and display, Applications of linked list : Addition of two polynomials using array.

Unit-3: Non Linear Data Structures [06 hrs]

Trees : Representation, Binary Trees, Tree Traversals , Binary Search Trees, Operations on BST, B-trees, B+ trees, Application of trees, Graphs - Representations, Breadth-first and Depth-first Search.

Unit-4: Searching & Sorting [04 hrs]

Linear search, Binary search, Bubble sort, Selection sort, Quick sort, Merge sort, Heap sort, Comparison between different sorting techniques

Unit-5: Linux Fundamentals **[08 hrs]**

Introduction to OS, Interfaces of OS: CLI, GUI, Brief history of Linux, Features of Linux, Difference between Windows and Linux, Linux file system, Architecture of Linux, Linux Distributions & Installation using CD/DVD or USB drive, The boot process, run levels, shutdown process, Linux Usage basics: Logging into the system, changing users and editing text files.

Unit-6: Linux Administration **[08 hrs]**

Running commands and getting help, basic commands & file-directory handling commands, Basic Desktop Operations, Network Management, Installing and Updating Software, Text editors & Graphical editors, User-group management, File attributes, executing C and C++ programs in Linux.

Text Books

1) 'Data Structures through C' by Yashwant P. Kanetkar
2) 'Principals of Data Stricture using C' by G.S.Baluja
3) 'Red Hat Linux: The Complete Bible' by Vijay Shekhar

Reference Books

1) 'Data Structures using C' by Yedidyah Langsam, Moshe J Augenstein, Aaron M Tenenbaum –
2) 'Linux the complete reference' by Richard Mathews (TMH)
3) 'Unix Concepts and Applications' by Sumitabha Das.

Section A : Unit 1,2,3

Section B : Unit 4,5,6

Pattern of Question Paper

Six units in the syllabus shall be divided into equal parts i.e. three units in each part. Question paper shall be set having two sections A and B as per weightage of units. Section A questions shall be set on first part and section B on second part. Question paper should cover entire syllabus.

For 80 Marks Paper:

1) Minimum 10 questions
2) Five questions in each section
3) Question no. 1 from section A and question no. 6 from section B having weightage of 10 marks each be made compulsory and should have at least 8 bits of 2 marks out of which five to be solved.
4) Two questions from remaining questions from each section A and B be asked to solve each having weightage of 15 marks.

ETC221: Lab-01: Electronics Devices and Circuits

Teaching scheme		**Examination scheme**	
Practical	: 2 hrs /week	Practical Exam	: 50 Marks
Credit	: 1		

LIST OF PRACTICALS:

Minimum eight experiments shall be performed from the bellow list. It is advised to conduct the practical on Bread board.

1. To calibrate amplitude & frequency of different waveforms on CRO/DSO with readings.
2. To plot V-I characteristics of P-N Junction Diode and Zener Diode.
3. To build Bridge rectifier with capacitor filter and to find line and load regulation and ripple factor.
4. To study of frequency response of RC coupled amplifier.
5. To study of frequency response of transformer coupled amplifier.
6. Plot characteristic of CSFET. Determine amplification factor, trans-conductance and dynamic resistance.
7. To plot characteristics of CS DMOS FET.
8. Study of RC integrator and differentiator for sine, square input.
9. Study of transistorized Astable & Monostable Multivibrator
10. To perform any one RC and LC oscillator.
11. To perform voltage series, voltage shunt and current shunt feedback topologies.

Practical Examination:

The Practical Examination shall be consisting of viva voce based on the practical work done during the course and on the syllabus.

ETC222: Lab 02: Analog Communication Engineering

Practical : 02hrs /week Practical/Oral Exam : 50 Marks

Credit : 1

Experiment List: (Perform any eight experiments)

1. To find the modulation index of AM using AM wave.
2. To find the modulation index of AM using trapezoidal pattern.
3. To study Fault finding of AM Receiver.
4. To study SSB modulation and demodulation.
5. To study sampling and its reconstruction.
6. To study PAM, PWM, and PPM.
7. Study of TDM & FDM.
8. To find the performance characteristics of a radio receiver like sensitivity, selectivity, fidelity.
9. To study FM transmitter and receiver.
10. To study AM demodulator.
11. To study FM demodulator.
12. To find the polar and Cartesian plot for dipole & yagi uda / Dipole antenna.

Practical Examination:

The Practical Examination shall be consisting of viva voce based on the practical work done during the course and on the syllabus. Duration of Examination is 3 hours.

ETC223: LAB-03: Network Analysis

Teaching scheme		**Examination scheme**	
Practical	: 02hrs /week	Practical/Oral Exam	: 50 Marks
Credit	: 1		

List of Experiments (Perform 8 Experiments based on syllabus)

1. Study and verify Kirchhoff's Law.
2. Study and verify series Resonance
3. Study and verify Parallel Resonance
4. Study and verify Superposition Theorem
5. Study and verify The Venin's Theorem
6. Study and verify Norton's Theorem
7. Study and verify Maximum power transfer theorem.
8. Study and verify Two Port Network
9. Study different parameter of filter
10. Study parameters of transmission lines.

Practical Examination:

The Practical Examination shall be consisting of viva voce based on the practical work done during the course and on the syllabus.

ETC224: LAB-04: Data Structure & Linux

Teaching scheme		**Examination scheme**	
Practical	: 02hrs /week	Term work/Oral Exam	: 50 Marks
Credit	: 1		

List of Practicals (Perform any 8 Experiments based on syllabus)

1. Menu driven program for performing operations on stack using array
2. Menu driven program for performing operations on stack using linked list
3. Menu driven program for performing operations on queue using array
4. Program to perform different operations on singly linked list
5. Program to perform operations on binary tree
6. Program for quick sort
7. Program for binary search
8. Installation of Linux operating system
9. Execution of various file & directory handling commands
10. Execution of C and C++ programs using CC and GCC compiler in Linux.

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

- Continuous Assessment.
- Performing the experiment in the laboratory.

ETC225: Lab-05: Electronic Workshop-I

Teaching scheme		Examination scheme	
Practical	: 04 hrs /week	Team work/Oral Exam	: 50 Marks
Credit	: 2		

Unit-1: Mini Project:

Students have to select any topic and complete mini project on it. He/she has to perform PCB designing, component selection, mounting, soldering, and testing of mini project.

It is expected by the students to submit printed report of mini project and deliver power point presentation and demo.

Unit-2: Case Study:

Study of Arduino model.

Unit-3: Case Study:

Study of Raspberry pi model.

Unit-4: Case Study:

Students have to study any industry and submit the report regarding the organization process & activities.

Unit-5: Case Study:

Implementation of small electronic circuits by using circuit simulation tools (eg. Circuit maker, PSpice, Multisim, OrCAD, etc.)

Reference Books:

1. M. H. Rashid, "Introduction to P-Spice using OrCAD for circuits and electronics", Pearson Edition.
2. User manuals of PROTEL, PROTEUS, OrCAD, Microcap.
3. W. C. Bosshart "Printed Circuit Boards- Design & Technology"- Tata Mcgraw Hill Publication.
4. Byron Francies, "Arduino: The Complete Beginner's Guide"
5. Simon Monk, "Programming the Raspberry Pi, Second Edition: Getting Started with Python"

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

- Continuous Assessment.
- Performing the experiment in the laboratory.
- Implementation of Mini Project based on basic Electronic Components.

BSH 251: Engineering Mathematics-IV

Teaching scheme		Examination scheme	
Theory	: 4 hrs. / week	Theory Exam	: 80 Marks (3hrs)
Credit	: 4	Class Test	: 20 Marks

Objectives:

- To develop Logical understanding of the subject
- To develop mathematical skill so that students are able to apply mathematical methods & Principal's in solving problems from Engineering fields
- To produce graduates with mathematical knowledge & computational skill.

Unit 1: Laplace Transform **[6 hrs]**

Definition, Transforms of elementary functions, Properties & theorems of Laplace transforms (without proof), transforms of periodic function, Heaviside unit step function, displaced unit step function, Dirac delta function, error function, Bessel' function of zero order.

Unit 2: Inverse Laplace Transform and its Applications **[6 hrs]**

Inverse Laplace transforms by using (i) properties, ii) partial fractions, iii) Convolution theorem, Applications to solve linear differential equations with constant coefficients (Initial value problems), Simultaneous Linear differential equations.

Unit 3: Z Transform: **[8 hrs]**

Definition, Z transform of elementary functions, properties of Z transform, Inverse Z transform by using partial fraction and residues theorem, Solution of difference equation by Z transform.

Unit 4: Numerical Methods and Curve Fitting **[8 hrs]**

Solution of transdental equations by Newton Raphson method, Gauss Seidel method to solve simultaneous linear equations, Lagranges interpolation formula for unequal intervals, numerical differentiation: Newton's forward and Newton's Backward difference formulae, Solution of ordinary differential equation by Eular modified Method and Runge-Kutta IVth order method, Curve fitting: Principle of least squares, Fitting of linear curve, parabola, exponential curve.

Unit-5: Function of Complex Variable (Differential calculus): [6 hrs]

Introduction, Analyticfunction Cauchy Riemann equations in Cartesian and Polar form, Harmonic function, Laurent's series (without proof), Conformal mapping: Translation, Magnification, Rotation and inversion bilinear transformation.

Unit 6: Function of Complex Variable (Integral calculus): [6 hrs]

Line integral, contour integral: Cauchy's integral theorem, Cauchy's integral formula Residues, Cauchy's residue theorem (All theorems without proof),

Note:

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Text Books:

1. P. N. Wartikar and J. N. Wartikar, "A Text Book of Engineering Mathematics (Volume-I, II,III) " Pune Vidyarthi Griha Prakashan, Pune.
2. B. S. Grewal, "Higher Engineering Mathematics," Khanna Publications, New Delhi.
3. H. K. Das, "Advanced Engineering Mathematics," S. Chand & Company.

Reference Books:

1. B.V. Ramana, "Higher Engineering Mathematics," (Tata McGraw-Hill).
2. Erwin Kreyszig, "Advanced Engineering Mathematics," Wiley Eastern Ltd.
3. Ravish R Singh, Mukul Bhat, "Engineering Mathematics A Tutorial Approach," by,Mc Graw Hill

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6). Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 and 6 be made compulsory and should have at least EIGHT bits of two marks out of which FIVE to be solved.
4. Two questions from remaining questions from each section be asked to solve having weightage of 15 marks

ETC252: High Speed Analog Devices

Teaching scheme		**Examination scheme**	
Theory	: 4 hrs / week	Theory Exam	:80 Marks (3hrs)
Credit	: 4	Class Test	: 20 Marks

Objectives:

These courses should result in,

- Study of fundamentals of Operational amplifier, its linear and nonlinear applications, PLL and its applications.
- Study of working and different analysis of High speed semiconductor devices.
- Study and applications of High speed Operational amplifiers.

Unit-1: Operational Amplifier Fundamentals (7 hrs)

Basic building blocks of op-amplifier, pin diagram of 741 IC, Op-amplifier parameters, inverting and noninverting configuration. Ideal characteristics on Op-amp, Linear Application of op-amplifier: Summing amplifier, difference amplifier, instrumentation amplifier, Schmitt trigger, comparator IC such as LM339, bandwidth and slew rate limitation, precision rectifiers and peak detector**.**

Unit-2: Non Linear Applications and Phase Lock Loops (7 hrs)

Sample and hold circuit, Analog to Digital and digital to analog conversion techniques, precision half wave & full wave rectifier, instrumentation amplifier, Phase lock loop IC 565 operating principle, locking capture range, applications of PLL: FM detector, Frequency synthesizer, AM detector. Voltage to frequency converter, frequency to voltage converter.

Unit-3: High Speed Operational Amplifiers: (6 hrs)

Folded Cascade Voltage Feedback Op-Amps, Case study of AD847, Current Feedback Op-Amps (CFB), CFB model and Bode plot, study of AD8011, Comparison of specifications of Current feedback Op-amp family AD8001, AD8002, AD8009 and AD8073, Noise comparisons between VFB and CFB Op Amps, PSRR Characteristics.

Unit-4: High Speed Devices and Circuits (6 hrs)

Requirements of high speed devices circuits and materials, Materials for high speed devices and circuits, high electron mobility transistors, Principle and operation and unique features of HEMT, Heterojunction bipolar transistors, principle of operation, benefits of hetero junction BJT for high speed applications

Unit-5: Applications of High Speed Systems **(7 hrs)**

Optimizing feedback network for maximum bandwidth fitness, driving capacitive load, cable drivers and receivers, high performance video line driver, Differential line drivers and receivers, high speed clamping amplifiers, Mixers, Power amplifiers, Linear drivers.

Unit-6: High speed Data Conversion Overview **(7 hrs)**

Converter sampling rate, resolution, architectures, applications, Successive approximation ADCs, Pipelined ADCs, High speed ADC Applications in Software Radios ADC Applications in video, ADC Applications in ultrasound

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Text Books:

1. Op Amps and Linear Integrated Circuits : Ramakant Gaikwad

Reference Books:

1. Integrated Circuits : K. R. Botkar
2. Operational Amplifier : G. B Clayton
3. Intuitive operational amplifiers : Thomas Frederiksen, McGraw hill 1998
4. Operational Amplifier, Linear Integrated Circuits : Coughlin, Driscoll
5. Design with operational Amplifiers and Analog Integrated circuits : Sergio Franco

Section A: Includes Unit 1,2,3

Section B: Includes Unit 4,5,6.

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.

ETC253: Digital Logic Design

Teaching scheme		Examination scheme	
Theory	: 4 hrs / week	Theory Exam	: 80 Marks (3hrs)
Credit	: 4	Class Test	: 20 Marks

Objectives:

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- To prepare students to perform the analysis and design of various digital electronic circuits.

Unit-1: Logic Families (06 hrs)

Characteristics of digital IC's, Bipolar Logic Families: operation of Transistor-Transistor logic (TTL) Tri-State Logic. Unipolar logic Families: PMOS, NMOS, and CMOS. BiCMOS, Logic Family, Comparison of TTL, CMOS, ECL, RTL, I2L, DCTL logic families.

Unit-2: Combinational Logic Design (06 hrs)

Standard representation for Logic functions: Sum-of-Products and Product-of-Sums methods. Simplification of Logic functions using Karnaugh Map, Don't care conditions, Quine-Mc Clusky minimization technique,

Design examples on Arithmetic building blocks: Half–adder, Full-adder, Half-subtractor, Full-subtractor, Binary to Gray and Gray to Binary code converters.

Unit-3: Data-Processing Circuits (08 hrs)

Parallel Adder (IC7483), Arithmetic logic Unit (IC 74181), Multiplexers, Demultiplexers, multiplexers/Demultiplexers Trees, BCD-to-Seven-segment Decoders, Encoders, Parity Generators and Checkers, Comparator

Unit-4: Sequential Logic Circuit (08 hrs)

Flip-Flops: Memory cell, R-S, J-K, Race around condition, Master-slave J-K, D, T, excitation table, flip-flop conversion, **Counter**: design of Asynchronous (ripple) counter, 4 bit up/down counter, Design of synchronous counter using ICs, 4 bit up/down, MOD- N counters, **Shift register**: SISO, SIPO, PISO, PIPO, Right shift, Left shift, IC7495/74195

Unit-5: Synchronous Sequential Machines (06hrs)

Moore and Mealy machines, representation techniques, state diagram, state table, state reduction, state assignment, implementation using flip-flops, Applications like sequence generator and detection.

Unit-6: Semiconductor Memories and Introduction to HDL (06hrs)

Semiconductor Memory: Memory organization and operation, Expanding memory size, classification and characteristics of memory, RAM, ROM, EPROM, SRAM, DRAM, flash memory,

Introduction to HDLs

Library, Entity, Architecture, Modeling styles, Data objects, Concurrent and sequential statements, Design examples, using VHDL for basic combinational and sequential circuits, Attributes (required for practical) Test benches and FSM excluded)

Text Books:

1. R.P. Jain "Modern Digital Electronics", Mc Graw Hill

Reference Books:

1. Donald P Leach, Albert Paul Malvino, Goutam Saha "Digital Principles and Applications", Mc Graw Hill
2. Morris Mano "Digital Logic & Computer Design", Pearson.
3. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss "Digital Systems,Principles and Applications", Pearson, Tenth Edittion
4. J. Bhaskar, "VHDL Primer" 3rd Edition.PHI Publication.
5. Volnei Pedroni, "Digital: Electronics and Design with VHDL", Elsevier

Section A: Unit 1, 2, 3.

Section B: Unit 4, 5, 6.

PATTERN OF QUESTION PAPER

Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.

For 80 Marks papers:

1. Minimum 10 questions
2. Five questions in each section
3. Question no.1 from section A and question no.6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B

ETC254: Signal & Systems

Teaching scheme		Examination scheme	
Theory	: 4 hrs / week	Theory Exam	: 80 Marks (3hrs)
Credit	: 4	Class Test	: 20 Marks

Objectives:

- Demonstrate an understanding of the fundamental properties of linear systems, by explaining the properties to others.
- Use linear systems tools, especially transform analysis and convolution, to analyze and predict the behavior of linear systems.
- Gain an appreciation for the importance of linear systems analysis in aerospace systems.

Unit-1: Introduction to Signals and Systems [**08 hrs]**

Definition of signals and systems, Classification of signals: Continuous time and discrete time, even and odd, periodic and non-periodic, deterministic and non-deterministic, energy and power.

Basic signals: sine, cosine, exponential, step, impulse, ramp, rectangular, triangular, signum, sinc and their properties Operations on signals: Amplitude scaling, addition, multiplication, differentiation, integration, time scaling, time shifting and folding. Classification of system: linear and nonlinear, time variant and invariant, causal and non-causal, static and dynamic, stable and unstable, invertible and noninvertible.

Unit-2: System Analysis **[06 hrs]**

System modeling: Input output relation, impulse response, block diagram, integro-differential equation. Definition of impulse response, convolution integral, convolution sum, computation of convolution integral using graphical method for unit step to unit step, unit step to exponential, exponential to exponential and unit step to rectangular, rectangular to rectangular only. Computation of convolution sum. Properties of convolution, system interconnection, system properties in terms of impulse response, step response in terms of impulse response.

Unit-3: CT and DT System Analysis using Fourier Transform [**08 hrs]**

Definition and necessity of CT and DT Fourier series and Fourier transforms. CT Fourier series, CT Fourier Transform and its properties, problem solving using properties, limitation of Fourier transform analogy between CTFS and DTFS. Response of LTI system to exponential signal, periodic signals, application of Fourier series and Fourier transform to system analysis.

Unit-4: System Analysis in Frequency Domain using Laplace Transform **[06 hrs]**

Definition and its properties, ROC and pole zero concept. Application of Laplace transforms to the LTI system analysis. Inversion using duality, numerical based on properties. Signal analysis using LT.

Unit-5: Correlation **[06 hrs]**

Definition of Correlation, correllogram, analogy between correlation, covariance and convolution, Conceptual basis, auto-correlation, cross correlation, properties of auto correlation, properties of cross Correlation, inter relation between correlation and spectral density.

Unit-6: Energy Spectral Density and Power Spectral Density **[06 hrs]**

Definition of ESD, Properties of ESD, Physical implementation of numerical on ESD. Definition of PSD, Properties of PSD. Correlation and spectral density relation. Numerical on PSD. Relation between auto correlation and ESD. Sampling theorem and its proof, Effect of under sampling, sampling of band pass signals

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Text Books:

1. Simon Haykins and Barry Van Veen, "Signals and Systems", 2nd Edition, Wiley India.
2. Simon Haykins, "An Introduction to Analog and Digital Communications", Wiley India.

Reference Books:

1. Roberts M.J, "Signals and Systems", TMH
2. Luider, "Signals and Systems"
3. B.P. Lathi, "Linear Systems and Signals"
4. I J Nagrath, "Signals and Systems"
5. Luis. F. Chaparro, "Signals and Systems" , Academic Press an imprint of Elsevier Inc, 2011

Section A: Unit 1, 2, 3.

Section B: Unit 4, 5, 6.

PATTERN OF QUESTION PAPER

Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.

For 80 Marks papers:

1. Minimum 10 questions

2. Five questions in each section

3. Question no.1 from section A and question no.6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.

4. Two questions from remaining questions from each section A and B

ETC255: Electrical Machines and Instrumentation

Teaching scheme	Examination scheme
Theory : 4 hrs / week	Theory Exam : 80 Marks (3hrs)
Credit : 4	Class Test : 20 Marks

Objectives:

- To prepare students to perform the analysis of any electromechanical system.
- To empower students to understand the working of electrical equipment used in everyday life.
- The ability to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.
- The skill to analyze the response of any electrical machine.
- The ability to troubleshoot the operation of an electrical machine.

Unit-1: DC Machines [6 hrs]

DC machines construction, working principle (motor & generator), EMF equation of DC Machine (motor and generator), Types and its characteristics of DC machines (motor and generator), back emf, starters of dc machine, Speed control of DC motor Breaking of DC motor, applications of DC machines (motor and generator)

Unit-2: Induction Motor and Synchronous Motor [10 hrs]

Induction Motor: Construction, working principle, types, torque equation, torque slip characteristics, power stages, losses and efficiency, starters speed control, breaking, applications,

Synchronous motor: Construction, working principle, starting methods, effect of load, hunting, V-curve, synchronous condenser, applications`

Unit-3: Special Purpose Machines [4 hrs]

Construction, working and application of steeper motor, variable reluctance motor, servo motor, FHP motor, hysteresis, repulsion, linear IM.

Unit-4: Sensors and Transducers [7 hrs]

Classification selection of transducers strain gauges, LVDT, Temperature transducers, piezoelectric, photosensitive transducers, Hall effect transducers, proximity devices Digital transducers need of signal conditioning and types, interfacing techniques of transducers with microprocessor and controller.

Unit-5: Industrial Measurement and Industrial Applications [9 hrs]

Measurement of vibration, electrical telemetry thickness, humidity, thermal conductivity and gas analysis emission computerized tomography, smoke and fire detection, burglar alarm, object counter level measurement, on /off timers, RTC, sound level meter, tachometer, VAW meter

Unit-6: I/O Devices and Display **[4 hrs]**

Recorder X-Y plotters its applications, optical oscillograph, cold cathode display, fluorescent display LED, LCD, alphanumeric, Bar graph display.

List of Text Books

1) Electrical Machines by Ashfaqu Husain, Dhanpatrai and publication
2) Electrical and electronics instrumentation and measurement

List of Reference Books

1) Electrical Technology Volume-II, AC &DC machines by B.L. Thareja
2) Instrumentation Devices System edition C.S. Rajan ,G.R. sharma

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Section A: Unit 1, 2, 3.

Section B: Unit 4, 5, 6.

PATTERN OF QUESTION PAPER

Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.

For 80 Marks papers:

1. Minimum 10 questions

2. Five questions in each section

3. Question no.1 from section A and question no.6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.

4. Two questions from remaining questions from each section A and B

ETC271: Lab-06: High Speed Analog Devices

Teaching scheme		**Examination scheme**	
Practical	: 02hrs /week	Termwork/Oral Exam	: 50 Marks
Credit	: 1		

List of Practicals:

(Not Less than 10)

1. Op-Amp application as inverting and non- inverting amplifier
2. Op- amp as Integrator
3. Op- amp as Differentiator amplifier
4. Op-Amp as Schmitt Trigger
5. Op-Amp as Comparator
6. Op-Amp as Phase Lock Loop amplifier
7. Design and build Precision Half way and Full Way Rectifier
8. Voltage to Frequency and frequency to voltage convertors
9. Instrumentation amplifier
10. To study current feedback amplifier with its characteristics.
11. To study the characteristics of HEMT.
12. To study Successive approximation ADCs,

List of Equipment's /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

ETC272: Lab-07: Digital Logic Design

Teaching scheme		**Examination scheme**	
Practical	: 02hrs /week	Practical/Oral Exam	: 50 Marks
Credit	: 1		

List of Laboratory Experiments

PART A: Experimentation using discrete component

1. Operation of Arithematic building blocks
2. Study of Arithematic logic unit (ALU IC 74181).
3. Code conversion operations: Binary to Gray, Gray to Binary
4. Multiplexers
5. Demultiplexers, Decoders & Encoders
6. Study of flip-flops: RS, JK, MSJK, D & T.
7. Counter Design Using ICs
8. Shift registers Using ICs

PART B: **Experimentation using VHDL Code**

Write, simulate and verify, VHDL Code for

1. Logic gates.
2. Half adder/full adder.
3. Gray to binary/binary to gray.
4. D Flip-flop.
5.

PRACTICAL EXAMINATION:

The practical examination will be of three hour's duration. It will consist of one experiment conducted during the course and an Oral examination based on the syllabus.

ETC273: Lab-08: Signal & Systems

Teaching scheme		**Examination scheme**	
Practical	: 02hrs /week	Practical/Oral Exam	: 50 Marks
Credit	: 1		

List of Experiments:

It is advised to conduct practical with the help of any computational software like MATLAB/OCTAVE etc. Perform any 10 programs.

1) Introduction to MATLAB/OCTAVE etc.
2) Program to plot CT and DT signals.
3) Program for operations on CT signals.
4) Program for operations on DT signals.
5) Program to generate text signals.
6) Program to generate sampled signals.
7) Program to find convolution.
8) Program to find correlation.
9) Program to study properties of FT.
10) Program to compute even and odd part of signal.
11) Program to compute DFT.
12) Program to compute FFT.
13) Program to compute linear convolution using DFT.
14) Program for circular convolution using DFT.
15) Program to study properties of LT.

PRACTICAL EXAMINATION:

The practical examination will be of three hour's duration. It will consist of one experiment conducted during the course and an Oral examination based on the syllabus.

ETC252: Electrical Machines and Instrumentation

Teaching scheme		**Examination scheme**	
Practical	: 02hrs /week	Termwork/Oral Exam	: 50 Marks
Credit	: 1		

List of practical

Perform any FOUR

1. Study of Starters of DC machines
2. Speed control of dc motor
3. Load test of DC motor
4. Speed control of induction motor
5. Load test on Induction motor
6. Torque slip characteristics of Induction motor

Perform any FOUR

1. Determine LVDT characteristics
2. Determine RTD characteristics
3. Determine thermocouple characteristics
4. Study of Burglar alarm
5. Study of type of display

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

- Continuous Assessment.
- Performing the experiment in the laboratory.
- Implementation of Mini Project based on basic Electronic Components.

BSH 275: Communication Skills-I

Teaching scheme		Examination scheme	
Practical	: 04 hrs /week	Termwork / Oral Exam	: 50 Marks
Credit	: 2		

The teacher shall explain in detail, the gist and techniques involved in the following work units to the students. The teacher shall subsequently formulate the exercises to adjudge the skill sets acquired by the students.

Unit 1 Time Management [04 Hr]

Value of time, Diagnosing Time Management, Weekly Planner to do list and Prioritizing work.

Unit 2: Grammar and Usage [08 Hr]

Overview of basic Mid-level English Grammar, Parts of speech, Preparations and Conditions, Tense and Concept of time, Sentence Construction (Concord), Vocabulary: Words, Idioms, Phrases, Antonyms and Synonyms

Unit 3: Speaking Skills [08 Hr]

Training in Sound Recognition, the speech process, message, audience, speech style, feedback, conversation and oral skills, fluency and self-expression body language phonetics and spoken English, speaking techniques, word stress, correct stress patterns, voice quality, correct tone, types of tones, Presentation skills-planning, preparation, organization, Stress and Intonation pattern in spoken communication, Sound Recording Exercise (Language Lab Exercise), Communication Errors in English

Unit 4: Listening and Reading Skills [08 Hr]

Active and Passive Listening, the reading process, purpose, different kinds of texts, reference material, scientific and technical texts, active and passive reading, strategies- vocabulary skills, eye reading and visual perception, Skimming and scanning reading, drawing inferences and conclusions, comprehension of technical material- scientific and technical texts, instructions and technical manuals, graphic information. Note making- tool for study skills.

Unit 5: Writing Skills [06 Hr]

Identification of different writing styles (Four Writing Style), Types of reports, information and analytical reports, oral and written reports, formal and non-formal reports, printed forms, letter and memo format, manuscript format, proposals, technical articles, journal articles and conference papers, Drafting: Memo, Circulars, Notices, agendas etc. E-mails, Business Memos / Letters, Employment Communication- resume design, resume style.

Unit 6 Developing Skills and Presentations [06 Hr]

Developing key traits 1: creativity, critical thinking and problem solving. Effective Presentations- Gathering Information and Building Presentation. Presentation by students in team.

Text Books:

1. 'Effective Technical Communication' by M Ashraf Rizvi, Tata McGraw Hill Publishing Company Ltd.
2. 'Basic Managerial Skills for all' E. H. McGrath, Eastern Economy Edition, Prentice hall India.
3. 'Developing Communication Skills' Krishna Mohan, Meera Banerji, McMillan India Ltd.
4. Skills' Krishna Mohan, Meera Banerji, McMillan India Ltd.