।। सा विद्या या विमुक्तये ।।
स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड
"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)
SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)
Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade
25 1994 - 2019 SILVER JUBILEE YEAR

ACADEMIC (1-BOARD OF STUDIES) SECTION

Phone: (02462) 229542
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E-mail: bos.srtmun@gmail.com

विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे अभ्यासक्रम शैक्षणिक वर्ष २०१९–२० पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, **दिनांक ०८ जून २०१९ रोजी संपन्न झालेल्या ४४व्या मा. विद्या परिषद बैठकीतील ऐनवेळचा विषय क्र.११/४४–२०१९** च्या ठरावानुसार **प्रस्तुत विद्यापीठाच्या विज्ञान व तंत्रज्ञान विद्याशाखेतील** खालील विषयांचे अभ्यासक्रम शैक्षणिक वर्ष २०१९–२० पासून लागू करण्यात येत आहे.

1. B.E. – II Year – Electronics & Telecommunication/
   Elecronics & Communication Engineering

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेत–स्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–०१/परिपत्रक/विज्ञान व तंत्रज्ञान अभ्यासक्रम/२०१९–२०/७९७
दिनांक : ३१.०७.२०१९.

स्वाक्षरित/–
उपकुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) मा. प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

CURRICULUM

For

UNDERGRADUATE DEGREE COURSES IN

B. E. SECOND YEAR ELECTRONICS & TELECOMMUNICATION / ELECRONICS & COMMUNICATION ENGINEERING

(CGPA-REVISED)

(Engineering & Technology)

[Proposed from 2019-20]

For

Swami Ramanand Teerth Marathwada University Nanded

SEMESTER – III (Second Year)

Branch/Course: Electronics & Telecommunication/Electronics &Communication Engineering

Sr. NO	Category	Code	Course Title	Teaching Scheme				Examination Scheme					Grand Total
				L	T	P	CR	PR	OR	TW	MSE	ESE	
1	Program Core Course	PCC-EC301	Electronic Devices & Circuits	3	0	2	4	25#	0	25	30	70	150
2	Program Core Course	PCC-EC302	Digital Electronics	3	0	2	4	25#	0	25	30	70	150
3	Program Core Course	PCC-EC303	Network Theory	3	1	2	5	25@	0	25	30	70	150
4	Program Core Course	PCC-EC304	Data Structure	3	0	2	4	0	25@	25	30	70	150
5	Basic Science course	BSC305	Mathematics III	3	1	0	4	0	0	0	30	70	100
6	Humanities and Social Sciences including Management courses	HSMC 306	Humanities I (Effective Technical Communication)	2	0	0	2	0	25@	25	0	0	50
7	Mandatory Courses (non-credit)	MC-307	Constitution of India/Essence of Indian Traditional Knowledge	2	0	0	0	0	25@	25	0	0	50
Total				**19**	**2**	**8**	**23**	75	75	150	150	350	**800**

Symbols to remember: -@ - Internal Assessment, # - External Assessment T – Theory , P– Practical, T – Tutorial , CR – Credit , OR – Oral , TW – Term work, MSE – Minor Semester Examination, ESE – End Semester Examination.

SEMESTER – IV (Second Year)

Branch/Course: Electronics & Telecommunication/Electronics &Communication Engineering

Sr. NO	Category	Code	Course Title	Teaching Scheme				Examination Scheme					Grand Total
				L	T	P	CR	PR	OR	TW	MSE	ESE	
1	Program Core Course	PCC-EC401	Analog Communication	3	0	2	4	25@	0	25	30	70	150
2	Program Core Course	PCC-EC402	Analog Circuits	3	0	2	4	25#	0	25	30	70	150
3	Program Core Course	PCC-EC403	Microcontrollers & Applications	3	0	4	5	50#	0	25	30	70	175
4	Program Core Course	PCC-EC 404	Signals & Systems	3	1	2	5	0	25@	25	30	70	150
5	Basic Science Course	BSC-405	Mathematics – IV	3	0	0	3	0	0	0	30	70	100
6	Mandatory Courses (non-credit)	MC-406	Environmental Science	2	0	0	0	0	0	0	15	35	50
7	Humanities and Social Sciences including Management Courses	HSMC 407	Interpersonal Skills and Personality development	0	0	2	1	0	25@	0	0	0	25
Total				**17**	**1**	**12**	**22**	**100**	**50**	**100**	**165**	**385**	**800**

Symbols to remember: -@ - Internal Assessment, # - External Assessment T – Theory , P–Practical, T – Tutorial , CR – Credit , OR – Oral , TW – Term work, MSE – Minor Semester Examination, ESE – End Semester Examination.

PCC-EC301	Electronic Devices And Circuits	3L:0T:2P	4 credits

Module 1: Introduction to Semiconductor Physics: (08 Hours)

Review of Quantum Mechanics, Mobility & conductivity, Charge densities in a semiconductor, Fermi Diac distribution, carrier concentrations & Fermi levels in a semiconductor. Diffusion & continuity equation, Mass action law, Hall Effect, Electrons in periodic Lattices, E-k diagrams. Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity; sheet resistance, design of resistors.

Module 2: Generation and recombination of carriers: (06 Hours)

Poisson and continuity equation P-N junction characteristics, I-Characteristics, and small signal switching models; Avalanche breakdown, Zener diode, Schottky diode.

Module 3: Bipolar Junction Transistor: (06 Hours)

I-V characteristics, Transfer characteristics, Current gains, alpha, beta & operating point, Transistor biasing & stabilization techniques, Thermal runaway, Thermal stability techniques, Elbors-Moll Model, MOS capacitor, C-V characteristics, MOSFET, I-V characteristics, and small signal models of MOS transistor, LED, photodiode and solar cell.

Module 4: Diode Circuits, Amplifier models: (08 Hourse)

Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier. Biasing schemes for BJT and FET amplifiers, bias stability, various configurations (such as CE/CS, CB/CG, CC/CD) and their features, small signal analysis,low frequency transistor models,estimation of voltage gain,input resistance, output resistance etc.,design procedure for particular specifications,low frequency analysis of multistage amplifiers. Wave shaping circuits: Clipper and Clampers.

Module 5: High frequency transistor models: (08 Hours)

Frequency response of single stage and multistage amplifiers, cascade amplifier.Various classes of operation (ClassA,B,AB,Cetc.),their power efficiency and linearity issues.Feedback topologies:Voltage series,current series,voltage shunt,current shunt, effect of feedback on gain,band width etc.,calculation with practical circuits,conceptof stability,gain margin and phase margin. Multivibrator circuits using transistors.

Text /Reference Books:

1 G. Streetman, and S. K. Banerjee, "Solid State Electronic Devices," 7th edition, Pearson,2014.

2 D. Neamen , D. Biswas "Semiconductor Physics and Devices," McGraw-Hill Education 3.S. M. Sze and K. N. Kwok, "Physics of Semiconductor Devices," 3rd edition, John Wiley &Sons, 2006.

3 C.T. Sah, "Fundamentals of solid state electronics," World Scientific Publishing Co. Inc, 1991.

4 Y. Tsividis and M. Colin, "Operation and Modeling of the MOS Transistor," Oxford Univ. Press, 2011.

5 J.Millman andA.Grabel,Microelectronics,2nd edition,McGrawHill,1988.

6 P.Horowitz and W.Hill,The Art of Electronics,2nd edition,Cambridge University Press,1989.

7 A.S. Sedra and K.C. Smith,Microelectronic Circuits,Saunder's College Publishing.

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Understand the principles of semiconductor Physics
2. Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.
3. Understandthecharacteristicsofdiodesandtransistors
4. Designandanalyzevariousrectifierandamplifiercircuits
5. Designsinusoidal andnon-sinusoidaloscillators

List of Practicals:

1. Study of digital multimeter.
2. To obtain I-V characteristic of Diode.
3. To measure ripple factor at the output of
   (a) Half wave rectifier with and without filter capacitor
   (b) Full Wave rectifier with and without filter capacitor
   (c) Bridge rectifier with and without filter capacitor.
4. To verify performance of various Clipper circuits.
5. To verify performance of various Clamper circuits.
6. To obtain I-V characteristic of Zener Diode.

7. To obtain I-V characteristic of photo diode.
8. To obtain characteristic of transistor as a switch circuit.
9. To obtain input and output characteristics and calculate gain of CE amplifier circuit.
10. To obtain input and output characteristics and calculate gain of CB amplifier circuit.
11. To obtain frequency response of single stage transistor amplifier.
12. To obtain the transfer characteristics of FET.
13. To Verify Feedback amplifiers

PCC-EC302	Digital Electronics	3L:0T:2P	4 credits

Module1: Introduction and Logic Gates (6 Hours)

Number System,Boolean Algebra,Boolean Laws and De-Morgan's Theorem, Logic gates:

Basic gates and Derived Gates NAND and NOR as Universal gates. Boolean Algebra: Fundamentals of Boolean laws. Duality Theorem, De Morgan's theorems. numerical based on simplification of logic equations.

Module2: (12 Hours)

Combinational Logic Circuits

SOP and POS form, Canonical Forms, Karnaugh Maps up to 6 variables, Binary codes, code conversion.

Standard representation of canonical forms (SOP & POS), Maxterm & Minterm), conversion between SOP and POS forms. K-map reduction technique upto 4 variables. (SOP & POS form), Design of half and full Adder, half and Full Subtractor using K-map, Code Converter using K-map: Gray to Binary, Binary to Gray Code Converter up to 4-bit.

Multiplexers(MUX): MUX tree De-multiplexers (DEMUX): Demux tree, Demux as decoder

Driver & Multiplexed Display, Half Adder & Half Subtractor, full Adder & Full Subtractor, serial and parallel adder, BCD adder, Barrel Shifter and ALU. Study of IC 74151, IC 74155 Priority Encoder 8:3, Decimal to BCD Encoder Tristate logic, Unidirectional & bidirectional buffer ICs: IC 74244 and IC 74245.

Module3: (8 Hours)

Sequential Logic Circuit:

One bit memory cell - RS latch – using NAND & NOR, Triggering Methods Edge and level trigger, Flip Flops - S R Flip flop, Clocked SR flip flop with preset and clear, Drawbacks of SR Flip flop Clocked JK Flip flop with preset & clear, Race around condition in JK flip flop, Master slave JK flip flop. Clocked JK Flip flop with preset & clear, Race around condition in JK flip

flop, Master slave JK flip flop , D and T type flip flop , Excitation table of flip flops , Block schematic and function table of IC-7474, 7475,74373.

Counter: Modulus of counter, their types as Asynchronous and Synchronous counter Asynchronous counter Synchronous counter. Ring counter Twisted ring counter

Shift Register Finite state machines , design of synchronous FSM, Algorithmic State Machines Charts. Designing Synchronous Circuits like pulse train generator pseudo random Binary sequence generator, clock generation.

Module4: (10 Hours)

Logic Families:

Characteristics of logic families & Comparison between different logic families. Logic families such as TTL, CMOS, ECL. TTL NAND gate – Totem pole output, open collector. CMOS Inverter specification of logic families, Noise Margin, Propagation Delay, Fan in Fan out, tri state TTl, ECL, CMOS Families and their interfacing Memory Element , Concept of programmable logic device like FPGA.

Principle of operation and classification of memory. Organization of memories RAM (Static, Dynamic), Volatile and Non-Volatile ROM (PROM, EPROM, EEPROM) Flash memory. Comparison between EPROM and Flash.

Module5: (4 Hours)

VLSI Design flow:

Design entry: Schematic, FSM & HDL, different modeling styles in VHDL, Data typesand objects, Dataflow, Behavioral and Structural Modeling, Synthesis and Simulation VHDL constructs and codes for combinational and sequential circuits.

ASIC design flow CPLD -Xilinx and Atmel series architecture, Details of internal block diagram Introduction to FPGA like Xilinx (FPGA), SPARTAN 3 series and Atmel

Text/Reference Books:

1. R.P. Jain, “Modern digital Electronics”, Tata McGraw Hill, 4th edition, 2009.
2. Douglas Perry, “VHDL”, Tata McGraw Hill, 4th edition, 2002.
3. W.H. Gothmann, “Digital Electronics- An introduction to theory and practice”, PHI, 2nd edition ,2006.
4. D.V. Hall, “Digital Circuits and Systems”, Tata McGraw Hill, 1989
5. Charles Roth, “Digital System Design using VHDL”, Tata McGraw Hill 2nd edition 2012.

Course outcomes:

At the end of this course students will demonstrate the ability to

1. Design and analyze combinational logic circuits
2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder
3. Design & analyze synchronous sequential logic circuits
4. Use HDL & appropriate EDA tools for digital logic design and simulation

List of Practicals:

1. To study and Verify De Morgan's Theorem by using logic gate.
2. To design adder and Subtractor by using logic gate.
3. To realize and verify RS flip flop using NAND gate
4. To realize master slave JK Flip-Flop using IC 7476.
5. To design Multiplexer using logic gates
6. To realize de multiplexer using logic gates
7. To design shift register
8. To implement 4 bit ripple counter.
9. Write VHDL program for any two basic gates.
10. Write VHDL program for full adder / subtractor & Synthesize using FPGA.
11. Write VHDL program for 8:1 multiplexer & Synthesize using FPGA.
12. Write VHDL program for 2:4 Decoder & Synthesize using FPGA

PCC-EC303	Network Theory	3L:1T:2P	5credits

Module1. **(8 Hours)**

Network Theorems :Node and Mesh Analysis, matrix approachof network containing voltage and current sources, and reactance, source transformation and duality. Network theorems: Super position, reciprocity, Thevenin's,Norton's, Maximum power Transfer, compensation and Tallegen's theorem as appliedto AC. circuits. Trigonometric and exponential Fourier series: Discretespectra and symmetry of wave form, steady state response of a network tonon-sinusoidalperio dicinputs, power factor, effectivevalues, Fouriertrans form and continuousspectra, three phaseun balanced circuit and power calculation.

Module2. **(10 Hours)**

Graph Theory

Graph Theory: Introduction, Linear graph of network, Tie-set and cut set schedule, incidence matrix, Analysis of resistive network using cut set and tie-set, Dual of network.

Coupled circuits: Self Inductance and Mutual inductance, coefficient of coupling, dot convention, ideal Transformer, Analysis of multi winding coupled circuits, Analysis of single and double tuned circuits.

Module3. **(10 Hours)**

Laplace Transforms and properties:

Partial fractions, singularity functions, waveform synthesis, analysis of RC, RL, and RLC networks with and without initial conditions with Laplace transforms evaluation of initial conditions.

Module 4. **(12 Hourse)**

Dynamic Analysis & System:

Transient behavior, concept of complex frequency, Driving points and transfer functions poles and zeros of function, their properties, sinusoidal response from pole-zero locations, convolution theorem and Two fourport network and their parameters and interconnections, Behaviors of series and parallel resonant circuits, Introduction to band pass, lowpass, highpass and band reject filters.

Text/Reference Books

1. Van, Valkenburg.; "Network analysis"; Prentice hall of India, 2000
2. Sudhakar, A., Shyammohan, S. P.; "Circuits and Network"; Tata McGraw-Hill New Delhi, 1994
3. A William Hayt, "Engineering Circuit Analysis" 8th Edition, McGraw-Hill Education Course

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Understand basics electrical circuits with nodal and mesh analysis.
2. Appreciate electrical network theorems.
3. Apply Laplace Transform for steady state and transient analysis.
4. Determine different network functions.
5. Appreciate the frequency domain techniques.

List of Practical:-

1. To know your electric circuit's lab.
2. Apply the thieving theorem for finding current in a complex electrical circuit.
3. Verify the Norton's theorem.
4. Verify the super position theorems.
5. Verify the maximum power transfer theorem force circuits.
6. Find different electrical parameter in R.L, R.C, R.L.C. series circuits and draw the
   a. Phasor diagram and determine current and P.f. in each case
   b. Determine and observe the resonance condition.
7. Find different electrical parameter in R-C & R-L-C parallel circuit and draw the
   a. Phasor diagram& Find power and P.F. of the circuit
   b. observe parallel resonance condition.
8. Verification of series resonance using hard ware and digital simulation.
9. Verification of parallel resonance using hard ware and digital simulation
10. Verification of self-inductance and mutual inductance by using hard ware.
11. To find z & y parameters of a given two port network.

PCC-EC 304	Data Structure	3L:0T:2P	4 credits

Course contents: Module 1: **(8 Hourse)**

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. **Searching:** Linear Search and Binary Search Techniques and their complexity analysis.

Module 2: **(14 Hourse)**

Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

Module 3: **(10 Hours)**

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis. **Trees:** Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees. B Tree, B+ Tree: definitions, algorithms and analysis.

Module 4: **(10 Hours)**

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing. **Graph:** Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

Suggested books:

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, and Computer Science Press.

Suggested reference books:

1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company "How to Solve it by Computer", 2nd Impression by R.G. Dromey, Pearson Education.

Objectives of the course:

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures

List of Practical's:-

1. Write a program which accept information about five student and display same information according to ascending order of their name.
2. Write a program to implement stack.
3. Write a program to convert infix expression into postfix expression.
4. Write a program to implement queue.
5. Write a program to implement circular queue
6. Write a program to implement link list with insert, delete, search, view, and delete function.
7. Write a program to implement ordered link list.
8. Write a program to create doubly link list.
9. Write a program to implement tree with insert, delete and search function.
10. Write a program for binary search and sequential search.
11. Write a program for bubble sort and sequential search.
12. Write a program for insertion sort and quicksort.

BSC 305	Mathematics III	3L:1T:0P	4 credits

Module 1: Sequences and series: (4 Hours)

Convergence of sequence and series, tests for convergence, power series, Taylor's series. Series for exponential, trigonometric and logarithmic functions.

Module 2: Multivariable Calculus (Differentiation) (6 Hours)

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Module 3: Multivariable Calculus (Integration) (10 Hours)

Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar). Theorems of Green, Gauss and Stokes, orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds.

Module 4: First order ordinary differential equations (4 Hours)

Exact, linear and Bernoulli’s equations, Euler’s equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut’s type.

Module 5: Ordinary differential equations of higher orders (6 Hours)

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

6. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

7. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.

8. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

9. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.

10. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.

11. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.

HSMC306	Humanities-I (Effective Technical Communication)	2L:0T:0P	2 credits

Module 1: **(4 Hours)**

Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.

Module 2: **(8 Hours)**

Technical Writing, Grammar and Editing- Technical writing process, forms of discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Hunan factors, Managing technical communication projects, time estimation, Single sourcing, Localization.

Module 3: **(6 Hours)**

Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity

Module 4: **(8 Hours)**

Communication and Technical Writing- Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids, Personality Development. Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.

Module 5: **(4 Hours)**

Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity.

Text/Reference Books:

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
6. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
7. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

MC307	Constitution of India/ Essence of Indian Traditional Knowledge	2L:0T:0P	0 credits

Modul 1. **(2 Hours)**

Introduction Constitution - meaning of the term,, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy

Module 2. **(4 Hours)**

Union Government and its Administration - Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha

Module 3. **(2 Hours)**

State Government and its Administration - Governor: Role and Position, CM and Council of ministers, State Secretariat: Organization, Structure and Functions

Module 4. **(6 Hours)**

Unit IVLocal Administration - District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

Module 5. **(4 Hours)**

Election Commission Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women

Module 6. **(6 Hours)**

Astronomy, Chemistry, Mathematics and Metallurgy in India –Siddhantik and Post siddhantik development of Astronomy, Early Chemical Techniques, Atomism in Vaiśeṣika, Chemistry in Early Literature,First Steps, Early Historical Period, The Classical Period, The Classical Period, post-Āryabhaṭa, The Kerala School of Mathematics, Features of Indian

MathematicsMetallurgy before and during the Harappan Civilization, After the Harappans, iron metallurgy, wootz steel, other iron pillars and beams, zinc, social context

Module 7. (2 Hours)

Medical Sciences in India: The Principles of Ayurvedic Healing, Treating diseases to restore health.

Module 8. (4 Hours)

Music, Theater and Drama in India -Origin, classification accompanied instrument, Bharata's Nāṭyaśāstra, New era, Medieval period, modern era, aesthetics of Indian classical music, forms of composition: Dhrupada, thumari, gazal, tarana, tappa, folk music, film musicTheater and Dram Its Beginnings, Classical Period, Major Indian Dramatists: Bhāsa, Kālidāsa, Bhavabhūti, Medieval Period, Kuṭiyaṭṭam, Yakṣagāna, Bhavāī, Jātrā, Nautaṅkī, Swāṅg, Rāmalīlā, Tamāśā, Nāchā, Pāṇḍavānī, Modern Era

References

1. 'Indian Polity' by Laxmikanth
2. 'Indian Administration' by Subhash Kashyap
3. 'Indian Constitution' by D.D. Basu
4. Āryabhaṭa
5. Vātsyāyana, Nāgārjuna, Al-Bīrūnī', Vāgbhaṭa
6. Taittīriya Brāhmaṇa, Yājñavalkya Smṛti, Viṣṇu Purāṇa, Skanda Purāṇa,
7. Nātyaśāstra, Viṣṇudharmottarapurāṇa-Khaṇḍa III, Bhakti Movement

PCC-EC401	Analog Communication	3L:0T:2P	4 credits

Module 1. **(6 Hours)**

Introduction

Introduction to communication system, Need for modulation. Amplitude modulation, definition, time domain and frequency domain description, power relations in AM waves. Genration of AM waves, square laws modulator, switching modulator, detection on AM wave ; square law detector, envelop detector.

Module 2. **(8 Hours)**

Angle Modulation Concepts

Basic concepts, Frequency modulation: Single tone frequency modulation, Spectrum analysis of sinusoidal FM wave, Narrow band FM , phase modulation, Wide band FM, Constant average power, Transmission bandwidth of FM wave – Comparison of FM and AM and PM.

Module 3. **(6 Hours)**

Angle Modulation Methods

Generation of FM waves: Direct methods: parametric variation method: vector diode, reactance modulator, indirect methods, Armstrong method, detection of FM waves, balanced frequency discriminator, zero crossing detector. PLL.

Mdule 4. **(8 Hourse)**

Noise

Source of noise, Types; of noise, white noise, partition noise, thermal noise, shot noise ,low frequency or flicker noise, burst noise, avalanche noise, SNR, Noise is analog communication system. Noise in DSB and SSB System, noise bandwidth, Noise in AM system, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis.

Module 5. **(6 Hourse)**

Receivers

Radio receiver-receiver type-tune radio frequency receiver, super heterodyne receiver, RF section and characteristics-frequency changing and tracking, intermediate frequency, AGC,FM receiver, comparison with AM receiver ,amplitude limiting

Module 6. **(6 Hours)**

Random Process

Probability random variable, probability density function, transformation of random variables, random process, and stationary means corrections and co variation functions.

Text/Reference Books:

1. Haykin S., "Communications Systems", John Wiley and Sons, 2001.
2. Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education, 2002.
3. Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.
4. Wozencraft J. M. and Jacobs I. M., ``Principles of Communication Engineering",John Wiley, 1965.

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Analyze and compare different analog modulation schemes for their efficiency and bandwidth
2. Analyze the behavior of a communication system in presence of noise
3. Investigate pulsed modulation system and analyze their system performance
4. Analyze different digital modulation schemes and can compute the bit error performance

List of Practicals:

1. To study amplitude modulation and demodulation.
2. To study frequency modulation and demodulation.
3. To study balanced modulator and Synchronous Detector.
4. To study Pre-emphasis and de-emphasis.
5. To study SSB System.
6. To study spectral analysis of AM and FM signals using spectrum analyzer.
7. To study Phase locked Loop
8. To study AGC characteristics.

PCC-EC402	Analog circuits	3L:0T:2P	4credits

Module 1: Oscillators: (06 Hours)

Block diagram of oscillators, Review of the basic concept,Barkhausen criterion,RC oscillators (phase shift,Wien bridge etc.),LC oscillators(Hartley,Colpitt,Clapp etc.),non-sinusoidal oscillators.

Module 2: OP-AMP applications: (08 Hours)

Review of inverting and non-inverting amplifiers,integrator and differentiator,summing amplifier,precision rectifier, Log and Antilog amplifiers,Schmitt trigger and its applications.Active filters:Low pass,highpass,bandpass and bandstop,design guidelines. Signal conditioning and processing and Instrumentation amplifiers using Op amp.

Module 3: Non Linear application of Op amp (10 Hours)

Non Linear application of Op amp. Op amp based Oscillator: Oscillators- principles and types, Phase shift oscillator, Wein bridge oscillator, square wave generator, triangular wave generator, saw-tooth wave generator, op amp as a multivibrators,.

Module 4: Converters (08 Hours)

Weighted resistor,R-2R ladder,resistor string etc.Analog- to-digital converters (ADC): Single slope, dual slope, successive approximation, flash etc.

Switched capacitor circuits: Basic concept, practical configurations, application in amplifier, integrator, ADC etc.

Module 5 : Integrated circuit fabrication process: (08 Hours)

Oxidation,diffusion,ion implantation,photo lithography,etching,chemical vapour deposition,sputtering,twin-tub CMOS process.

Text/ReferenceBooks:

1. J.V. Wait, L.P. Huelsman and GA Korn, Introduction to Operational Amplifier theory and applications,McGraw Hill,1992.
2. J.Millman andA.Grabel, Microelectronics, 2ndedition, McGrawHill,1988.
3. P.Horowitz andW.Hill, TheArtof Electronics, 2ndedition, Cambridge University Press,1989.
4. A.S. Sedra andK.C. Smith, Microelectronic Circuits, Saunder's College Publishing.

5. Paul R.Gray and Robert G.Meyer, Analysis and Design of Analog Integrated Circuits, JohnWiley,3rd Edition.
6. Basic Electronics devices and Circuits by Mahesh B Patil, PHI Learning PVT.

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Design sinusoidal and non-sinusoidal oscillators
2. Underst and the functioning ofOP-AMP and designOP-AMPbased circuits
3. Design ADC and DAC
4. IC fabrication

List of Practicals:

1. Design an inverting, non-inverting amplifiers
2. Design Instrumentation amplifier
3. Design of Integrator and differentiator amplifiers.
4. Design of Adder, subs tractor and averaging amplifier.
5. Design of OP-AMP based Oscillators
6. Design active filters.
7. Design RC Phase shift Oscillator using Op amp.
8. Design multivibrator using IC741
9. Design multivibrator using IC555
10. Design Schmitt trigger

PCC-EC403	Microcontrollers	3L:0T:4P	5 credits

Module 1: **(6 Hours)**

Introduction to Microprocessor and Microcontrollers

8 bit Microprocessor & Microcontroller architecture, comparison, advantages & applications of each. Harward & Von Neumann architecture, RISC & CISC comparison. Survey of 8 bit controllers and its features Definition of embedded system & its characteristics. Role of microcontroller in embedded System. Limitation of 8 bit microcontrollers. Study of RS232,RS 485,I2C,SPI protocols. Software & hardware tools for development of microcontroller based system such as assembler, compiler, IDÉ, Emulators, debugger, programmer, development board, DSO, Logic analyser

Module 2: **(6 Hours)**

8051 Architecture

MCS-51 architecture, family devices & its derivatives. Port architecture, memory organization, Overview of Instruction set. Interrupts of 8051 Serial data i/p and o/p, serial data transmission and communication counters and timers, timer modes timer/counter programming

Module 3: **(6 Hours)**

8051 Assembly Language Programming:

8051 Assembly programming, Assembling and running an 8051 program, 8051 data types and directives, 8051 flag bits and the PSW register, 8051 register banks and stack. Addressing Modes, 8051 Instructions: Data Transfer Instructions, Arithmetic and Logic Instructions, Branch Instructions, Subroutine Call and RET Instructions, Bit manipulation Instructions, I/O Port Programming, Assembly programming examples, Software development Tools for 8051: Assembler, Simulator, Compiler & Debugger,etc.

Module 4: **(6 Hours)**

8051 microcontroller interfacing:

Interfacing of Data memory and program memory, 8255, Keyboard and Display, interfacing of switches and LEDs with ports and its programming,

Module 5: **(6 Hours)**

8051 Interrupts:

Basic of Interrupts, 8051 Interrupt structure, Interrupt Programming, Programing External hardware interrupts

8051 Timers and Counters:

Timer/Counter organization, operation modes, programming in 8051 and Applications

Module 6: **(6 Hours)**

8051 Serial Communication:

Basics of Serial Communication, Synchronous and Asynchronous Communication, RS-232 protocol, MAX232, SFR and Modes of Serial Communication, Programming

Study of I/O Peripherals: Interfacing of Relays, Stepper Motor, LCD display, 8 bit ADC and DAC ICs and applications, Interfacing and Programming the PPI 8255 with 8051.

Applications of Microcontroller 8051

Introduction to ARM processor

Reference Books :

1. Muhammad Ali Mazidi and Janice Gillispe, The 8051 Microcontroller and embedded systems, Pearson Education Asia, Indian reprint 2002.
2. V Udayshankara, M S Mallikarjunaswamy, “801 Microcontroller”, Tata McGraw-Hill, 2009
3. Kenneth J. Ayala, The 8051 Micro-controller– Architecture, Programming & Applications, Third Edition, Cengage Learning, India, 2007
4. Ajay V Deshmukh, Microcontrollers (Theory and Applications) The McGraw- Hill Companies, 2005.
5. Raj Kamal, "Microcontrollers, architecture, programming, Interfacing and System Design", Pearson Education

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Do assembly language programming
2. Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc.
3. Develop systems using different microcontrollers
4. Understand RSIC processors and design ARM microcontroller based systems

List of Practicals:

1. Write and execute an ALP for I/O operations
2. Write and execute an ALP for arithmetic operations
3. Write and execute an ALP for logical operations
4. Write and execute an ALP for LED interfacing
5. Write and execute an ALP for Switch interfacing
6. Write and execute an ALP for Relay interfacing
7. Write and execute an ALP for Seven segment interfacing
8. Write and execute an ALP for Matrix keyboard interfacing
9. Write and execute an ALP for LCD interfacing
10. Write and execute an ALP for ADC interfacing
11. Write and execute an ALP for DAC interfacing
12. Write and execute an ALP for Stepper motor interfacing
13. Write and execute an ALP for DC motor interfacing

14. Write and execute an ALP for GSM interfacing
15. Write and execute an ALP for Serial port programming

ESC 404	Signals & Systems	3L:1T:2P	5 Credits

Module 1: **(8 Hours)**

Introduction to Signals and Systems: Signals and systems as seen in everyday life, and in various branches of engineering and science. Signal properties: periodicity, absolute integrability, determinism and stochastic character. Some special signals of importance: the unit step, the unit impulse, the sinusoid, the complex exponential, some special time-limited signals; continuous and discrete time signals, continuous and discrete amplitude signals. System properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, realizability. Examples.

Module 2: **(8 Hours)**

Behaviour of continuous and discrete-time LTI systems: Impulse response and step response, convolution, input-output behaviour with aperiodic convergent inputs, cascade interconnections. Characterization of causality and stability of LTI systems. System representation through differential equations and difference equations. State-space Representation of systems. State-Space Analysis, Multi-input, multi-output representation. State Transition Matrix and its Role. Periodic inputs to an LTI system, the notion of a frequency response and its relation to the impulse response.

Module 3: **(12 Hours)**

Fourier, Laplace and Z- Transforms: Fourier series representation of periodic signals, Waveform Symmetries, Calculation of Fourier Coefficients. Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality. The Discrete Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval's Theorem. Review of the Laplace Transform for continuous time signals and systems, system functions, poles and zeros of system functions and signals, Laplace domain analysis, solution to differential equations and system behaviour. The z-Transform for discrete time signals and systems, system functions, poles and zeros of systems and sequences, z-domain analysis.

Module 4: **(12 Hours)**

Sampling and Reconstruction: The Sampling Theorem and its implications. Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold. Aliasing and its effects. Relation between continuous and discrete time systems. Introduction to the applications of signal and system theory: modulation for communication, filtering, feedback control systems.

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand the concepts of continuous time and discrete time systems.
2. Analyse systems in complex frequency domain.
3. Understand sampling theorem and its implications.

Text/References:

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, "Signals and systems", Prentice Hall India, 1997.
2. J. G. Proakis and D. G. Manolakis, "Digital Signal Processing: Principles, Algorithms, and Applications", Pearson, 2006.
3. H. P. Hsu, "Signals and systems", Schaum's series, McGraw Hill Education, 2010.
4. S. Haykin and B. V. Veen, "Signals and Systems", John Wiley and Sons, 2007.
5. A. V. Oppenheim and R. W. Schafer, "Discrete-Time Signal Processing", Prentice Hall, 2009.
6. M. J. Robert "Fundamentals of Signals and Systems", McGraw Hill Education, 2007.
7. B. P. Lathi, "Linear Systems and Signals", Oxford University Press, 2009.

List of Practicals:-

1. A) Sketch and write mathematical expression for the following signals in CT and Discrete Time (DT) a) Sine b) Rectangular c) Triangular d) Exponential e) Unit Impulse f) Unit Step g) Ramp h) Signum i) Sinc

B) Classify and find the respective value for the above signals a) Periodic / Non Periodic b) Energy / Power

2. Generation and capturing of discrete time signals and plot them.
3. Discretization using different sampling rate and observing aliasing effect.
4. Observing the effects of lower sampling rate and higher sampling rate on CT signal.

5. Performing various operations on the signal using circuits and computational software.
6. Using digital circuit building block to perform operations on signals.
7. Simulation of continuous time LTI system.
8. Simulation of discrete time LTI systems.
9. Obtaining impulse response of the systems.

BSC 405	Mathematics- IV	3L:0T:0P	3 credits

Module 1. **(12 Hours)**

Vector Calculus:

Scalar and Vector point functions, Gradient, Divergence, Curl with geometrical physical interpretationjs, Directional: derivatives, Properties.

Line integrals and application to work done, Green's Lemma, Surface integrals and Volume integrals, Stoke's theorem and Gauss divergence theorem (both without proof).

Module 2. **(16 Hours)**

Laplace Transformation:

Existence condition, Laplace transform of standard functions, Properties, Inverse Laplace transform of functions using partial fractions, Convolution and coinvolution theorem. Solving linear differential equations using Laplace transform. Unit step function, Impulse function and Periodic function and their transforms.

Module 3. **(12 Hours)**

Fourier Series And Fourier Transform:

Fourier Series: Fourier Series, Euler's formulae, even and odd functions, having arbitrary periods, half range expansion, Harmonic analysis

Fourier Transforms: Fourier transform, Sine and Cosine transforms, Application to differential equations

Text Books:

1. Kresyzig, "Advanced Engineering Mathematics", John Wiley and Sons. (Latest edition).
2. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Narosa, 2003 (2^{nd} Ed.).
3. Dr. A. B. Mathur, V. P. Jaggi, "Advanced Engineering Mathematics", Khanna Publishers.
4. Engineering Mathematics , B. S. Grewal, Khanna Publication Aug 2000.
5. Engineering Mathematics , Jaggi & Mathur – Khanna Publication, 1985

Reference Books:

1. V. V. Mitin, M. P. Polis and D. A. Romanov, "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
2. R. Wylie, "Advanced Engineering Mathematics", McGraw-Hill, 1995.
3. Engineering Mathematics , V.P Mishra, Galgotia Publication 2000.

4. Advanced Engineering Mathematics, Louis C. Barsett, Additional McGraw hill Int. 6^{th}edition.

MC 406	Environmental Sciences	2L:0T:0P	0 credits

Module 1: **(2 Hours)**

Multidisciplinary nature of environmental studies Definition, scope and importance need for public awareness.

Module 2: **(4 Hours)**

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.

Module 3: **(2 Hours)**

Ecosystems: Concept of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession.• Food chains, food webs and ecological pyramids. • Introduction, types, characteristic features, structure and function of the following ecosystem: -a. Forest ecosystem

b. Grassland ecosystemc. Desert ecosystemd. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Module 4: **(2 Hours)**

Biodiversity and its conservation• Introduction – Definition: genetic, species and ecosystem diversity. • Biogeographically classification of India • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values • Biodiversity at global, National and local levels. • India as a mega-diversity nation • Hot-sports of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. • Endangered and

endemic species of India • Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Module 5 : (2 Hours)

Environmental Pollution : Definition • Cause, effects and control measures of :- a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards • Solid waste Management : Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. • Pollution case studies. • Disastermanagement: floods, earthquake, cyclone and landslides.

Module 6: (2 Hours)

Social Issues and the Environment:• From Unsustainable to Sustainable development • Urban problems related to energy • Water conservation, rain water harvesting, watershed management • Resettlement and rehabilitation of people; its problems and concerns. Case Studies • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.

• Wasteland reclamation. • Consumerism and waste products. • Environment Protection Act.

• Air (Prevention and Control of Pollution) Act. • Water (Prevention and control of Pollution) Act • Wildlife Protection Act • Forest Conservation Act • Issues involved in enforcement of environmental legislation. • Public awareness.

Module 7: (2 Hours)

Human Population and the Environment• Population growth, variation among nations. • Population explosion – Family Welfare Programme. • Environment and human health. • Human Rights. • Value Education. • HIV/AIDS.• Women and Child Welfare. • Role of Information Technology in Environment and human health. • Case Studies

Module 8 : (2 Hours)

Field work• Visit to a local area to document environmental assetsriver/ forest/ grass land /hill/ mountain• Visit to a local polluted site-Urban/Rural/Industrial/Agricultural • Study of common plants, insects, birds. • Study of simple ecosystems-pond, river, hill slopes, etc.

Objectives:-

1. Critical Thinking: demonstrate critical thinking skills in relation to environmental affairs

2. Communication: demonstrate knowledge and application of communication skills and the ability to write effectively in a variety of contexts.

3. Interdisciplinary Synthesis: demonstrate an ability to integrate the many disciplines and fields that intersect with environmental concerns.

4. Ecological Literacy: demonstrate an awareness, knowledge, and appreciation of the intrinsic values of ecological processes and communities.

5. Sustainability: demonstrate an integrative approach to environmental issues with a focus on sustainability.

References:-

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
4. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
5. De A.K., Environmental Chemistry, Wiley Eastern Ltd. g) Down to Earth, Centre for Science and Environment (R)
6. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
7. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)

HSMC407	**Interpersonal Skills and Personality development**	**0L:0T:2P**	**1 credits**

Module 1. (2 Hours)

Improving Perception Introduction- Meaning - Factors influencing perception - Perceptual process - Improving perception - Perception and its application in organisations. Exercise : Test your perception .

Module 2. (2 Hours)

Career Planning Introduction - Benefits of career planning - Guidelines for choosing a career - Myths about choosing a career - Tips for successful career planning - Developing career goals - Final thoughts on career planning - Things one should know while starting carrer and during his carrer. Exercise: Test your career interests

Module 3. (2 Hours)

Art of Listening Introduction - - Two ears, one mouth - Benefits of active listening - Kinds of listening - Factors that hamper listening - Common poor listening habits - Advantages of active listening - Listening tips.

Module 4. (2 Hours)

Art of Reading Introduction - Reading is a cognitive process - Good readers are what they read - Benefits of reading - Different types of reading - Tips for effective reading - The SQ3R technique - Different stages of reading - Rates of reading - Determining a student's reading rate - Adjusting reading rate - Activities for increasing reading rate - Problems with reading - Becoming an effective reader. Exercise : Test your reading skills

Module 5. (4 Hours)

Art of Speaking Introduction - What makes communication important? - Defining communication - Special features of communication - Communication process - Channels of communication - Formal communication network - Informal communication network (grapevine communication) - Importance of communication - Barriers to communication - Tips for effective communication - Converstion tips - What is presentation? - Tips for powerful presentation - Art of public speaking - Importance of public speaking - Benefits of public speaking - Public speaking tips - Over coming fear of public sheaking.

Module 6. (2 Hours)

Art of Writing - Importance of writing - Creative writing - Writing tips - Drawbacks of written communication. Exercise : Test your handwriting Art of Writing E-mail: The mail magic - Use appropriate salutations - Make the subject matter significant - Keep a dictionary close by - Use commas - Use smileys – When

Module 7. (2 Hours)

Team Building and Teamwork Introduction - Meaning - Aspects of team building - Skills needed for teamwork - A model of team building - Team Vs Group - Characteristics of effective team - Role of a team leader - Role of team members - Nine persons a successful team should have - Inter-group collaboration - Advantages of inter-group collaboration - Difficulties faced in inter-group collaboration - Factors shaping inter-group collaboration. Exercise : Test your teamwork skills

Module 8. (2 Hours)

Group Discussion - Meaning of GD - Why group discussion? - Characters tested in a GD - Tips on GD - Types of GD - Skills required in a GD - Consequences of GD - Behaviour in a GD - Essential elements of GD - Different characters in GD - Traits tested in a GD - GD etiquette - Areas to be concentrated while preparing for a GD - Initiating a GD - Techniques to initiate a GD - Non-verbal communication in GD - Movement and gestures to be avoided in a GD - Topics for GD.

Module 9. (2 Hours)

Etiquette and Manners Modern etiquette - Benefits of etiquette - Classification of etiquette - Accompanying women - Taboo topics - Proposing the toast. Manners Introduction - Poor manners noticed in youth - Why should you practice good manners? - Practicing good manners - Manners at the wheel: Driving - Manners in the flight - Respecting the sacred : Visiting holy places - Dealing with the challenged - Attending funeral - Professional manners - Social skills (manners) - Getting along with people - Manners to get respect from others - To sum up - Corporate grooming tips - Mind your mobile manners - Annoying office habits. Exercise 1 : Test your etiquette Exercise 2 : Test your manners

Reference Books

1. Soft Skills – Know yourself and Know your world by Dr.K.Alex – S.Chand and Publications, New Delhi

2. Presonality development and soft skills –by Barun K Mishra – Oxford University Press.- 2011