

Common Courses for B.Tech. Second Year (AICT Module Curriculum) effective from academic session 2019-20

SEMESTER- III													
Sr.No.	Subject Codes	Subject	Periods	Evaluation Scheme					End Semester			Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1.	KAS301	Technical Communication	2	0	2	30	20	50		100		150	3
2.	KNC301/ KNC302	Cyber Security/ Environmental Science	2	0	0	15	10	25		50			NC

SEMESTER- IV													
Sl.No.	Subject Codes	Subject	Periods	Evaluation Scheme					End Semester			Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1.	KAS402	Maths-III (CE)	3	1	0	30	20	50		100		150	4
2.	KAS401	Maths-IV (CSE,EE,EN,EC,CH,ME,TX)	3	1	0	30	20	50		100		150	4
3.	KAS403	Maths-V (AG/BT)	3	1	0	30	20	50		100		150	4
4.	KVE401	Universal Human Values	3	0	0	30	20	50		100		150	3
5.	KNC402/ KNC401	Environmental Science/ Cyber Security	2	0	0	15	10	25		50			NC

Engineering Science Courses for B.Tech.(AICTE Model Curriculum) 2nd Year
(effective from the session 2019-20)

SEMESTER - III/IV													
S.No.	Subject Codes	Subject	Evaluation Scheme						End Semester			Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KOE031/ KOE041/ KOE031H/KOE041H	Engineering Mechanics	3	1	0	30	20	50		100		150	4
2	KOE032/ KOE042/ KOE032H/KOE042H	Material Science	3	1	0	30	20	50		100		150	4
3	KOE033/KOE043/ KOE033H/KOE043H	Energy Science & Engineering	3	1	0	30	20	50		100		150	4
4	KOE034/KOE044/ KOE034H/KOE044H	Sensor & Instrumentation	3	1	0	30	20	50		100		150	4
5	KOE035/KOE045/ KOE035H/KOE045H	Basics Data Structure & Algorithms	3	1	0	30	20	50		100		150	4
6	KOE036/KOE046/ KOE036H/KOE046H	Introduction to Soft Computing	3	1	0	30	20	50		100		150	4
7	KOE037/KOE047/ KOE037H/KOE047H	Analog Electronics Circuits	3	1	0	30	20	50		100		150	4
8	KOE038/KOE048/ KOE038H/KOE048H	Electronics Engineering	3	1	0	30	20	50		100		150	4
9	KOE039/KOE049/ KOE039H/KOE049H	Digital Electronics	3	1	0	30	20	50		100		150	4

Sl.No.	Subject	
1	Engineering Mechanics	To be offered to any Engg. Branch except ME/CE/AG and allied branches
2	Material Science	
3	Energy Science & Engineering	To be offered to any Engg. Branch except EE and allied branches
4	Sensor & Instrumentation	
5	Basics Data Structure & Algorithms	To be offered to any Engg. Branch except CSE and allied branches
6	Introduction to Soft Computing	
7	Analog Electronics Circuits	To be offered to any Engg. Branch except EC and allied branches
8	Electronics Engineering	
9	Digital Electronics	

Important Note: CH/BT/TX Engg. and allied branches can be offered any of the above listed ES.

ENGINEERING MECHANICS

UNIT-I:

Two-dimensional force systems: Basic concepts, Laws of motion, Principle of transmissibility of forces, transfer of a force to parallel position, resultant of a force system, simplest resultant of two dimensional concurrent and non-concurrent force systems, distribution of force systems, free body diagrams, equilibrium and equations of equilibrium.

Friction: Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction – wedge friction.

UNIT-II:

Beam: Introduction, shear force and bending moment, different equations of equilibrium, shear force and bending moment diagram for statically determined beams.

Trusses: Introduction, simple truss and solution of simple truss, methods of F-joint and methods of sections.

UNIT-III:

Centroid and moment of inertia: Centroid of plane, curve, area, volume and composite bodies, moment of inertia of plane area, parallel axis theorem, perpendicular axis theorem, principle moment of inertia, mass moment of inertia of circular ring, disc, cylinder, sphere, and cone about their axis of symmetry.

UNIT-IV:

Kinematics of rigid body: Introduction, plane motion of rigid body, velocity and acceleration under translational and rotational motion, relative velocity.

Kinetics of rigid body: Introduction, force, mass and acceleration, work and energy, impulse and momentum, D'Alembert's principle and dynamic equilibrium.

UNIT-V:

Simple stress and strain: Introduction, normal and shear stresses, stress-strain diagrams for ductile and brittle material, elastic constants, one-dimensional loading of members of varying cross sections, strain energy.

Pure bending of beams: Introduction, simple bending theory, stress in beams of different cross sections.

Torsion: Introduction, torsion of shafts of circular cross sections, torque and twist, shear stress due to torque.

Books and References:

1. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004).
2. Vela Murali, "Engineering Mechanics", Oxford University Press (2010).
3. A Textbook of Engineering Mechanics, R.K. Bansal, Laxmi Publications.
4. Engineering Mechanics, R.S. Khurmi, S.Chand Publishing.
5. Meriam J.L. and Kraige L.G., "Engineering Mechanics- Statics - Volume 1, Dynamics- Volume 2", Third Edition, John Wiley & Sons (1993).
6. Rajasekaran S and Sankarasubramanian G., "Engineering Mechanics Statics and Dynamics", 3 rd Edition, Vikas Publishing House Pvt. Ltd., (2005).
7. Bhavikatti, S.S and Rajashekarappa, K.G., "Engineering Mechanics", New Age International (P) Limited Publishers, (1998).
8. Engineering mechanics by Irving H. Shames, Prentice-Hall.

MATERIAL SCIENCE

UNIT-I:

Phase Diagrams:

Solid solutions – Hume Rothery's rules – the phase rule – single component system – one-component system of iron – binary phase diagrams – isomorphous systems – the tie-line rule – the lever rule – application to isomorphous system – eutectic phase diagram – peritectic phase diagram – other invariant reactions – free energy composition curves for binary systems – microstructural change during cooling.

UNIT-II:

Ferrous Alloys:

The iron-carbon equilibrium diagram – phases, invariant reactions – microstructure of slowly cooled steels – eutectoid steel, hypo and hypereutectoid steels – effect of alloying elements on the Fe-C system – diffusion in solids – Fick's laws – phase transformations – T-T-T-diagram for eutectoid steel – pearlitic, bainitic and martensitic transformations – tempering of martensite – steels – stainless steels – cast irons.

UNIT-III:

Mechanical Properties:

Tensile test – plastic deformation mechanisms – slip and twinning – role of dislocations in slip – strengthening methods – strain hardening – refinement of the grain size – solid solution strengthening – precipitation hardening – creep resistance – creep curves – mechanisms of creep – creep-resistant materials – fracture – the Griffith criterion – critical stress intensity factor and its determination – fatigue failure – fatigue tests – methods of increasing fatigue life – hardness – Rockwell and Brinell hardness – Knoop and Vickers microhardness.

UNIT-IV:

Magnetic, Dielectric & Superconducting Materials:

Ferromagnetism – domain theory – types of energy – hysteresis – hard and soft magnetic materials – ferrites – dielectric materials – types of polarization – Langevin-Debye equation – frequency effects on polarization – dielectric breakdown – insulating materials – Ferroelectric materials – superconducting materials and their properties.

UNIT-V:

New Materials:

Ceramics – types and applications – composites: classification, role of matrix and reinforcement, processing of fiber reinforced plastics – metallic glasses: types, glass forming ability of alloys, melt spinning process, applications – shape memory alloys: phases, shape memory effect, pseudoelastic effect, NiTi alloy, applications – nanomaterials: preparation (bottom up and top down approaches), properties and applications – carbon nanotubes: types.

Text Books & References:

1. Balasubramanian, R. —Callister's Materials Science and Engineering. Wiley India Pvt. Ltd., 2014.
2. Raghavan, V. —Physical Metallurgy: Principles and Practice. PHI Learning, 2015.
3. Raghavan, V. —Materials Science and Engineering: A First course. PHI Learning, 2015.
4. Askeland, D. —Materials Science and Engineering. Brooks/Cole, 2010.

5. Smith, W.F., Hashemi, J. & Prakash, R. —Materials Science and Engineering. Tata McGraw Hill Education Pvt. Ltd., 2014.
6. Wahab, M.A. —Solid State Physics: Structure and Properties of Materials. Narosa Publishing House, 2009.

Energy Science and Engineering

Unit-I Energy and its Usage: Units and scales of energy use, Mechanical energy and transport, Heat energy: Conversion between heat and mechanical energy, Electromagnetic energy: Storage, conversion, transmission and radiation, Introduction to the quantum, energy quantization, Energy in chemical systems and processes, flow of CO₂, Entropy and temperature, carnot and Stirling heat engines, Phase change energy conversion, refrigeration and heat pumps, Internal combustion engines, Steam and gas power cycles, the physics of power plants. Solid-state phenomena including photo, thermal and electrical aspects

Unit-II Nuclear Energy: Fundamental forces in the universe, Quantum mechanics relevant for nuclear physics, Nuclear forces, energy scales and structure, Nuclear binding energy systematics, reactions and decays, Nuclear fusion, Nuclear fission and fission reactor physics, Nuclear fission reactor design, safety, operation and fuel cycles

Unit-III Solar Energy: Introduction to solar energy, fundamentals of solar radiation and its measurement aspects, Basic physics of semiconductors, Carrier transport, generation and recombination in semiconductors, Semiconductor junctions: metal-semiconductor junction & p-n junction, Essential characteristics of solar photovoltaic devices, First Generation Solar Cells, Second Generation Solar Cells, Third Generation Solar Cells

Unit-IV Conventional & non-conventional energy source: Biological energy sources and fossil fuels, Fluid dynamics and power in the wind, available resources, fluids, viscosity, types of fluid flow, lift, Wind turbine dynamics and design, wind farms, Geothermal power and ocean thermal energy conversion, Tidal/wave/hydro power

Unit-V Systems and Synthesis: Overview of World Energy Scenario, Nuclear radiation, fuel cycles, waste and proliferation, Climate change, Energy storage, Energy conservation. Engineering for Energy conservation: Concept of Green Building and Green Architecture; Green building concepts, LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption

Reference/Text Books

1. Energy and the Challenge of Sustainability, World Energy Assessment, UNDP, New York, (2000).
2. Perspective of Modern Physics, A. Beiser, McGraw-Hill International Editions (1968).
3. Introduction to Modern Physics, H.S. Mani and G.K.Mehta, East-West Press (1988).
4. Introduction to Electrodynamics, D. J. Griffiths, Fourth Edition, Prentice Hall (2013).
5. Introductory Nuclear Physics, R. K. Puri and V.K. Babbar, Narosa Publishing House (1996).
6. Physics of Solar Cells: From Basic Principles to Advanced Concepts by Peter Würfel, John Wiley & Sons, 2016
7. Principles of Solar Engineering, D.Y. Goswami, F.Kreith and J.F. Kreider, Taylor and Francis, Philadelphia, 2000.

SENSOR AND INSTRUMENTATION

Pre-requisites of course: Basic Electrical Engineering

Course Outcomes:		Knowledge Level, KL
Upon the completion of the course, the student will be able to:		
CO 1	Apply the use of sensors for measurement of displacement, force and pressure.	K ₃
CO2	Employ commonly used sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow and level.	K ₃
CO3	Demonstrate the use of virtual instrumentation in automation industries.	K ₂
CO4	Identify and use data acquisition methods.	K ₃
CO5	Comprehend intelligent instrumentation in industrial automation.	K ₂

Detailed Syllabus:

Unit- I:

Sensors & Transducer: Definition, Classification & selection of sensors, Measurement of displacement using Potentiometer, LVDT & Optical Encoder, Measurement of force using strain gauge, Measurement of pressure using LVDT based diaphragm & piezoelectric sensor.

Unit-II:

Measurement of temperature using Thermistor, Thermocouple & RTD, Concept of thermal imaging, Measurement of position using Hall effect sensors, Proximity sensors: Inductive & Capacitive, Use of proximity sensor as accelerometer and vibration sensor, Flow Sensors: Ultrasonic & Laser, Level Sensors: Ultrasonic & Capacitive.

Unit -III:

Virtual Instrumentation: Graphical programming techniques, Data types, Advantage of Virtual Instrumentation techniques, Concept of WHILE & FOR loops, Arrays, Clusters & graphs, Structures: Case, Sequence & Formula nodes, Need of software based instruments for industrial automation.

Unit-IV:

Data Acquisition Methods: Basic block diagram, Analog and Digital IO, Counters, Timers, Types of ADC: successive approximation and sigma-delta, Types of DAC: Weighted Resistor and R-2R Ladder type, Use of Data Sockets for Networked Communication.

Unit V:

Intelligent Sensors: General Structure of smart sensors & its components, Characteristic of smart sensors: Self calibration, Self-testing & self-communicating, Application of smart sensors: Automatic robot control & automobile engine control.

Text Books:

1. DVS Murthy, Transducers and Instrumentation, PHI 2nd Edition 2013
2. D Patranabis, Sensors and Transducers, PHI 2nd Edition 2013.
3. S. Gupta, J.P. Gupta / PC interfacing for Data Acquisition & Process Control, 2nd ED / Instrument Society of America, 1994.
4. Gary Johnson / Lab VIEW Graphical Programing II Edition / McGraw Hill 1997.

Reference Books:

1. Arun K. Ghosh, Introduction to measurements and Instrumentation, PHI, 4th Edition 2012.
2. A.D. Helfrick and W.D. cooper, Modern Electronic Instrumentation & Measurement Techniques, PHI – 2001
3. Hermann K.P. Neubert, “Instrument Transducers” 2nd Edition 2012, Oxford University Press.

Basics Data Structure and Algorithms

Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	Understand and analyze the time and space complexity of an algorithm	K ₂ , K ₄
CO 2	Understand and implement fundamental algorithms (including sorting algorithms, graph algorithms, and dynamic programming)	K ₂ , K ₃
CO 3	Discuss various algorithm design techniques for developing algorithms	K ₁ , K ₂
CO 4	Discuss various searching, sorting and graph traversal algorithms	K ₂ , K ₃
CO 5	Understand operation on Queue , Priority Queue , D-Queue.	K ₂

K₁- Remember, K₂- Understand, K₃- Apply, K₄- Analyze, K₅- Evaluate, K₆- Create

Basics Data Structure and Algorithms		
Detailed Syllabus		
Unit	Topic	Proposed Lecture
I	Introduction to data structure and Algorithms: Performance analysis of Algorithm, time complexity, Big-oh notation, Elementary data organization data structure operations, Recurrences, Arrays, Operation on arrays, representation of arrays in memory, single dimensional and multidimensional arrays, sparse matrices, Character storing in C, String operations.	08
II	Stack And Queue and Link List: Stack operation, PUSH and POP, Array representation of stacks, Operation associated with stacks Application of stacks, Recursion, Polish expression, Representation Queue, operation on Queue , Priority Queue , D-Queue , Singly and circularly linked list, List operations Lists implementations	08
III	Trees : Basic terminology, Binary Trees, Binary tree representation, Algebraic/expressions, Complete Binary Trees, Extended binary tree, representing binary trees in memory, linked representation of Binary trees, Traversing binary trees & Searching in binary trees, Inserting in binary search trees, Complexity of searching algorithm, Heaps, general trees, Threaded binary tree.	08
IV	Graphs: Terminology & representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, adjacency Matrices, Transversal, connected component and spanning trees, Minimum Cost spanning tree, Prims and Kruskal Algorithm, BFS, DFS, Shortest path and transitive closure, Activity networks, topological sort and critical paths.	08
V	Searching and Sorting: Linear search, binary Search, Internal and External sorting, Bubble sorting, selection sort, Insertion sort, quick sort, Two way merge sort, Heap sort, sorting on different keys, practical consideration for internal sorting, External Sorting, Storage Devices : Magnetic tapes, Disk Storage, Sorting with disks and Indexing techniques, introduction to B tree and B+ tree, File organization and storage management, Introduction to hoisting.	08
Text books: <ol style="list-style-type: none"> 1. Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest, Introduction to Algorithms, PHI. 2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication. 3. Weiss, "Data Structure & Algorithm Analysis in C", Addison Wesley. 4. Basse, "computer Algorithms: Introduction to Design & Analysis", Addison Wesley. 5. Lipschutz, "Data structure, "Schaum series. 6. Aho, Hopcroft, Ullman, "Data Structure & Algorithm", Addison Wesley. 7. Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education, 2008 		

Introduction to Soft Computing

Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.	K ₁ , K ₂
CO 2	Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic	K ₂ , K ₃
CO 3	Describe with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations.	K ₄
CO 4	Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications.	K ₂ , K ₃
CO 5	Develop some familiarity with current research problems and research methods in Soft Computing Techniques.	K ₅ , K ₆

K₁- Remember, K₂- Understand, K₃- Apply, K₄- Analyze, K₅- Evaluate, K₆- Create

Introduction to Soft Computing		
Detailed Syllabus		
Unit	Topic	Proposed Lecture
I	Introduction to Soft Computing, ARTIFICIAL NEURAL NETWORKS Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning – Back propagation networks - Kohonen's self-organizing networks - Hopfield network.	08
II	FUZZY SYSTEMS Fuzzy sets, Fuzzy Relations and Fuzzy reasoning, Fuzzy functions - Decomposition - Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making.	08
III	NEURO - FUZZY MODELING Adaptive networks based Fuzzy interface systems - Classification and Regression Trees - Data clustering algorithms - Rule based structure identification - Neuro-Fuzzy controls - Simulated annealing – Evolutionary computation	08
IV	GENETIC ALGORITHMS Survival of the Fittest - Fitness Computations - Cross over - Mutation - Reproduction - Rank method - Rank space method.	08
V	APPLICATION OF SOFT COMPUTING Optimisation of traveling salesman problem using Genetic Algorithm, Genetic algorithm based Internet Search Techniques, Soft computing based hybrid fuzzy controller, Introduction to MATLAB Environment for Soft computing Techniques.	08
Text books: <ol style="list-style-type: none"> 1.An Introduction to Genetic Algorithm Melanic Mitchell (MIT Press) 2.Evolutionary Algorithm for Solving Multi-objective, Optimization Problems (2nd Edition), Collelo, Lament, Veldhnizer (Springer) 3.Fuzzy Logic with Engineering Applications Timothy J. Ross (Wiley) 4.Neural Networks and Learning Machines Simon Haykin (PHI) 5.Sivanandam, Deepa, “ Principles of Soft Computing”, Wiley 6.Jang J.S.R, Sun C.T. and Mizutani E, "Neuro-Fuzzy and Soft computing", Prentice Hall 7.Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill 8.Laurene Fausett, "Fundamentals of Neural Networks", Prentice Hall 9.D.E. Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley 10.Wang, “Fuzzy Logic”, Springer 		

Analog Electronics Circuits	3L:1T:0P	4 Credits
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Unit	Topics	Lectures
I	Diode circuits, amplifier models: 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.	8
II	High frequency transistor models, frequency response of single stage and multistage amplifiers, cascode amplifier, various classes of operation (Class A, B, AB, C etc.), their power efficiency and linearity issues, feedback topologies: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., calculation with practical circuits, concept of stability, gain margin and phase margin.	8
III	Oscillators: Review of the basic concept, Barkhausen criterion, RC oscillators (phase shift, Wien bridge etc.), LC oscillators (Hartley, Colpitt, Clapp etc.), non-sinusoidal oscillators.	8
IV	Current mirror: Basic topology and its variants, V-I characteristics, output resistance and minimum sustainable voltage (VON), maximum usable load, differential amplifier: Basic structure and principle of operation, calculation of differential gain, common mode gain, CMRR and ICMR, Op-Amp design: Design of differential amplifier for a given specification, design of gain stages and output stages, compensation.	8
V	Op-Amp applications: Review of inverting and non-inverting amplifiers, integrator and differentiator, summing amplifier, precision rectifier, Schmitt trigger and its applications, active filters: Low pass, high pass, band pass and band stop, design guidelines.	8

Text/Reference Books:

1. J.V. Wait, L.P. Huelsman and GA Korn, "Introduction to Operational Amplifier theory and applications," McGraw Hill, 1992.
2. J. Millman and A. Grabel, "Microelectronics," 2nd edition, McGraw Hill, 1988.
3. P. Horowitz and W. Hill, "The Art of Electronics," 2nd edition, Cambridge University Press, 1989.
4. A.S. Sedra and K.C. Smith, "Microelectronic Circuits,"Saunders College Publishing, 4th edition.
5. Paul R. Gray and Robert G. Meyer, "Analysis and Design of Analog Integrated Circuits," John Wiley, 3rd edition.
6. Muhammad H. Rashid, "Electronic Devices and Circuits," Cengage publication, 2014.

Course Outcomes:

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

1. Understand the characteristics of diodes and transistors.
2. Design and analyze various rectifier and amplifier circuits.
3. Design sinusoidal and non-sinusoidal oscillators.
4. Understand the functioning of OP-AMP and design OP-AMP based circuits.
5. Design LPF, HPF, BPF, BSF.

Electronics Engineering	3L:1T:0P	4 Credits
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Unit	Topics	Lectures
I	PN junction diode: Introduction of semiconductor materials; Semiconductor diode: Depletion layer, V-I characteristics, ideal and practical, diode resistance, capacitance, diode equivalent circuits, transition and diffusion capacitance, Zener diodes breakdown mechanism (Zener and avalanche).	8
II	Diode application: Series, parallel and series, parallel diode configuration, half and full wave rectification, clippers, clampers, Zener diode as shunt regulator, voltage-multiplier circuits special purpose two terminal devices : light-emitting diodes, Varactor (Varicap) diodes, tunnel diodes, liquid-crystal displays.	8
III	Bipolar junction transistors and field effect transistor: Bipolar junction transistor: Transistor construction, operation, amplification action, common base, common emitter, common collector configuration dc biasing BJTs: operating point, fixed-bias, emitter bias, voltage-divider bias configuration. Collector feedback, emitter-follower configuration. Bias stabilization. CE, CB, CC amplifiers and AC analysis of single stage CE amplifier (re Model), Field effect transistor: Construction and characteristic of JFETs. AC analysis of CS amplifier, MOSFET (depletion and enhancement) type, transfer characteristic.	8
IV	Operational amplifiers: Introduction and block diagram of Op-Amp, ideal & practical characteristics of Op-Amp, differential amplifier circuits, practical Op-Amp circuits (inverting amplifier, non-inverting amplifier, unity gain amplifier, summing amplifier, integrator, differentiator), Op-Amp parameters: input offset voltage, output offset voltage, input biased current, input offset current differential and common-mode operation.	8
V	Electronic instrumentation and measurements: Digital voltmeter: Introduction, RAMP techniques digital multimeters: Introduction Oscilloscope: introduction, basic principle, CRT, block diagram of oscilloscope, simple, measurement of voltage, current phase and frequency using CRO, introduction of digital storage oscilloscope and comparison of DSO with analog oscilloscope.	8

Text /Reference Books:

1. Robert L. Boylestand / Louis Nashelsky, "Electronic Devices and Circuit Theory," Latest Edition, Pearson Education.
2. H S Kalsi, "Electronic Instrumentation", Latest Edition, TMH Publication.
3. Meetidehran/ A.K. singh "fundamental of electronics Engineering", New age international publisher.

Course Outcomes:

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

1. Understand the concept of PN junction and special purpose diodes.
2. Study the application of conventional diode and semiconductor diode.
3. Analyse the I-V characteristics of BJT and FET.
4. Analyzethe of Op-Amp, amplifiers, integrator, and differentiator.
5. Understand the concept of digital storage oscilloscope and compare of DSO with analog oscilloscope

DIGITAL ELECTRONICS KOE039/KOE039H/KOE049/KOE049H

Course Outcomes:		Knowledge Level, KL
Upon the completion of the course, the student will be able to:		
CO 1	Apply concepts of Digital Binary System and implementation of Gates.	K ₃
CO2	Analyze and design of Combinational logic circuits.	K ₄
CO3	Analyze and design of Sequential logic circuits with their applications.	K ₄
CO4	Implement the Design procedure of Synchronous & Asynchronous Sequential Circuits.	K ₃
CO5	Apply the concept of Digital Logic Families with circuit implementation.	K ₃

KL- Bloom's Knowledge Level (K₁, K₂, K₃, K₄, K₅, K₆)

K₁ – Remember K₂ – Understand K₃ – Apply K₄ – Analyze K₅ – Evaluate K₆ – Create

Detailed Syllabus

UNIT I

Digital System And Binary Numbers: Number System and its arithmetic Signed binary numbers, Logic simplification and combinational logic design: Binary codes, code conversion, review of Boolean algebra and Demorgans theorem, SOP & POS forms, Canonical forms, Karnaugh maps method up to five variable, Don't care conditions, POS simplification, NAND and NOR implementation, Quine McClusky method (Tabular method).

UNIT II

Combinational Logic: MSI devices like Magnitude comparator, Multiplexers, Demultiplexers, Decoders, Encoders. Multiplexed display, half and full adders, subtractors, serial and parallel adders, BCD adder

UNIT III

Sequential Logic And Its Applications: Storage elements: latches & flip flops, Characteristic Equations of Flip Flops, Flip Flop Conversion, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters: Johnson & Ring Counter.

UNIT IV

Synchronous & Asynchronous Sequential Circuits: Analysis of clocked sequential circuits with state machine designing, State reduction and assignments, Design procedure. Analysis procedure of Asynchronous sequential circuits, circuit with latches, Design procedure, Reduction of state and flow table, Race-free state assignment, Hazards.

UNIT V

Memory & Programmable Logic Devices: Digital Logic Families: DTL, DCTL, TTL, ECL & CMOS etc., Fan Out, Fan in, Noise Margin; RAM, ROM, PLA, PAL; Circuits of Logic Families, Interfacing of Digital Logic Families, Circuit Implementation using ROM, PLA and PAL

Text Books:

1. M. Morris Mano and M. D. Ciletti, "Digital Design", Pearson Education.
2. Digital Circuits and Design, S. Salivahanan, Oxford University Press
3. David J. Comer, "Digital Logic & State Machine Design", Oxford University Press.
4. RP Jain, "Modern Digital Electronics", McGraw Hill Publication.
5. A. Anand Kumar, "Fundamental of Digital Circuits," PHI 4th edition, 2018.
6. D.V. Hall, "Digital Circuits and Systems," McGraw Hill, 1989.

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY LUCKNOW



Evaluation Scheme & Syllabus

For

B.Tech. 2nd

Syllabus of Non Credit Courses

On

Choice Based Credit System

(Effective from the Session: 2018-19)

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY LUCKNOW

DETAILED SYLLABUS

COMPUTER SYSTEM SECURITY		
Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats	K ₁ , K ₂
CO 2	To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats	K ₂
CO 3	To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques.	K ₃
CO 4	To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios	K ₄
CO 5	To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques.	K ₅ , K ₆
DETAILED SYLLABUS		3-1-0
Unit	Topic	Proposed Lecture
I	Computer System Security Introduction: Introduction, What is computer security and what to learn? , Sample Attacks, The Marketplace for vulnerabilities, Error 404 Hacking digital India part 1 chase. Hijacking & Defense: Control Hijacking ,More Control Hijacking attacks integer overflow ,More Control Hijacking attacks format string vulnerabilities, Defense against Control Hijacking - Platform Defenses, Defense against Control Hijacking - Run-time Defenses, Advanced Control Hijacking attacks.	08
II	Confidentiality Policies: Confinement Principle ,Detour Unix user IDs process IDs and privileges , More on confinement techniques ,System call interposition ,Error 404 digital Hacking in India part 2 chase , VM based isolation ,Confinement principle ,Software fault isolation , Rootkits ,Intrusion Detection Systems	08
III	Secure architecture principles isolation and leas: Access Control Concepts , Unix and windows access control summary ,Other issues in access control ,Introduction to browser isolation . Web security landscape : Web security definitions goals and threat models , HTTP content rendering .Browser isolation .Security interface , Cookies frames and frame busting, Major web server threats ,Cross site request forgery ,Cross site scripting ,Defenses and protections against XSS , Finding vulnerabilities ,Secure development.	08
IV	Basic cryptography: Public key cryptography ,RSA public key crypto ,Digital signature Hash functions ,Public key distribution ,Real world protocols ,Basic terminologies ,Email security certificates ,Transport Layer security TLS ,IP security , DNS security.	08
V	Internet Infrastructure: Basic security problems , Routing security ,DNS revisited ,Summary of weaknesses of internet security ,.Link layer connectivity and TCP IP connectivity , Packet filtering firewall ,Intrusion detection.	08

Text books: 1. William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010. 2. Michael T. Goodrich and Roberto Tamassia, Introduction to Computer Security, Addison Wesley, 2011. 3. William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010. 4. Alfred J. Menezes, Paul C. van Oorschot and Scott A. Vanstone, Handbook of Applied Cryptography, CRC Press, 2001.		
Mapped With : https://ict.iitk.ac.in/product/computer-system-security/		

PYTHON PROGRAMMING		
Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	To read and write simple Python programs.	K ₁ , K ₂
CO 2	To develop Python programs with conditionals and loops.	K ₂ , K ₄
CO 3	To define Python functions and to use Python data structures — lists, tuples, dictionaries	K ₃
CO 4	To do input/output with files in Python	K ₂
CO 5	To do searching ,sorting and merging in Python	K ₂ , K ₄
DETAILED SYLLABUS		3-1-0
Unit	Topic	Proposed Lecture
I	Introduction: The Programming Cycle for Python , Python IDE, Interacting with Python Programs , Elements of Python, Type Conversion. Basics: Expressions, Assignment Statement, Arithmetic Operators, Operator Precedence, Boolean Expression.	08
II	Conditionals: Conditional statement in Python (if-else statement, its working and execution), Nested-if statement and Elif statement in Python, Expression Evaluation & Float Representation. Loops: Purpose and working of loops , While loop including its working, For Loop , Nested Loops , Break and Continue.	08
III	Function: Parts of A Function , Execution of A Function , Keyword and Default Arguments ,Scope Rules. Strings : Length of the string and perform Concatenation and Repeat operations in it. Indexing and Slicing of Strings. Python Data Structure : Tuples , Unpacking Sequences , Lists , Mutable Sequences , List Comprehension , Sets , Dictionaries Higher Order Functions: Treat functions as first class Objects , Lambda Expressions	08

IV	<p>Sieve of Eratosthenes: generate prime numbers with the help of an algorithm given by the Greek Mathematician named Eratosthenes, whose algorithm is known as Sieve of Eratosthenes.</p> <p>File I/O : File input and output operations in Python Programming</p> <p>Exceptions and Assertions</p> <p>Modules : Introduction , Importing Modules ,</p> <p>Abstract Data Types : Abstract data types and ADT interface in Python Programming.</p> <p>Classes : Class definition and other operations in the classes , Special Methods (such as <code>_init_</code>, <code>_str_</code>, comparison methods and Arithmetic methods etc.) , Class Example , Inheritance , Inheritance and OOP.</p>	08
V	<p>Iterators & Recursion: Recursive Fibonacci , Tower Of Hanoi</p> <p>Search : Simple Search and Estimating Search Time , Binary Search and Estimating Binary Search Time</p> <p>Sorting & Merging: Selection Sort , Merge List , Merge Sort , Higher Order Sort</p>	08

Text books:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 (<http://greenteapress.com/wp/thinkpython/>)
2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. John V Guttag, —Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013
4. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
5. Timothy A. Budd, —Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015.
6. Kenneth A. Lambert, —Fundamentals of Python: First Programs, CENGAGE Learning, 2012.
7. Charles Dierbach, —Introduction to Computer Science using Python: A Computational ProblemSolving Focus, Wiley India Edition, 2013.
8. Paul Gries, Jennifer Campbell and Jason Montojo, —Practical Programming: An Introduction to Computer Science using Python 3, Second edition, Pragmatic Programmers, LLC, 2013.

Mapped With : <https://ict.iitk.ac.in/product/python-programming-a-practical-approach/>

KVE301/
KVE 401/
KVE 301H/
KVE 401 H

Universal Human Values and Professional Ethics

L	T	P	C
3	0	0	3

Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content and process of value education.
2. To help students initiate a process of dialog within themselves to know what they 'really want to be' in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

Course Outcome:

On completion of this course, the students will be able to

1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
3. Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
4. Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

Catalogue Description

Every human being has two sets of questions to answer for his life: a) what to do? and, b) how to do?. The first set pertains to the value domain, and the other to the skill domain. Both are complimentary, but value domain has a higher priority. Today, education has become more and more skill biased, and hence, the basic aspiration of a human being, that is to live with happiness and prosperity, gets defeated, in spite of abundant technological progress. This course is aimed at giving inputs that will help to ensure the right understanding and right feelings in the students in their life and profession, enabling them to lead an ethical life. In this course, the students learn the process of self-exploration, the difference between the Self and the Body, the naturally acceptable feelings in relationships in a family, the comprehensive human goal in the society, the mutual fulfillment in the nature and the co-existence in existence. As a natural outcome of such inputs, they are able to evaluate an ethical life and profession ahead.

UNIT-1

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Understanding the need, basic guidelines, content and process for Value Education, Self-Exploration—what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT-2

Understanding Harmony in the Human Being - Harmony in Myself

Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’, Understanding the needs of Self (‘I’) and ‘Body’ - Sukh and Suvidha, Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer), Understanding the characteristics and activities of ‘I’ and harmony in ‘I’, Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.

UNIT-3

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding harmony in the Family- the basic unit of human interaction , Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship, Understanding the meaning of *Vishwas*; Difference between intention and competence, Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*SarvabhaumVyawastha*)- from family to world family!.

UNIT-4

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

UNIT-5

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly

production systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) At the level of society: as mutually enriching institutions and organizations.

Text Books:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

References:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome’s report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
7. A N Tripathy, 2003, Human Values, New Age International Publishers.
8. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) KrishiTantraShodh, Amravati.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

Mode of Evaluation:

Assignment/ Seminar/Continuous Assessment Test/Semester End Exam

Mathematics-IV

(PDE, Probability and Statistics)

**Computer/Electronics/Electrical & Allied Branches, CS/IT, EC/IC, EE/EN,
Mechanical & Allied Branches, (ME/AE/AU/MT/PE/MI/PL)**

Textile/Chemical & Allied Branches, TT/TC/CT, CHE/FT

Subject Code	KAS302/ KAS402/ KAS302H/ KAS402H					
Category	Basic Science Course					
Subject Name	MATHEMATICS-IV					
Scheme and Credits	L-T-P	Theory Marks	Sessional		Total	Credit
			Test	Assig/Att.		
	3—1—0	100	30	20	150	4
Pre- requisites (if any)	Knowledge of Mathematics I and II of B. Tech or equivalent					

Course Outcomes

The objective of this course is to familiarize the students with partial differential equation, their application and statistical techniques. It aims to present the students with standard concepts and tools at an intermediate to superior level that will provide them well towards undertaking a variety of problems in the discipline.

The students will learn:

- The idea of partial differentiation and types of partial differential equations
- The idea of classification of second partial differential equations, wave , heat equation and transmission lines
- The basic ideas of statistics including measures of central tendency, correlation, regression and their properties.
- The idea s of probability and random variables and various discrete and continuous probability distributions and their properties.
- The statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties.

Module I: Partial Differential Equations

Origin of Partial Differential Equations, Linear and Non Linear Partial Equations of first order, Lagrange's Equations, Charpit's method, Cauchy's method of Characteristics, Solution of Linear Partial Differential Equation of Higher order with constant coefficients, Equations reducible to linear partial differential equations with constant coefficients.

Module II: Applications of Partial Differential Equations:

Classification of linear partial differential equation of second order, Method of separation of variables, Solution of wave and heat conduction equation up to two dimension, Laplace equation in two dimensions, Equations of Transmission lines.

Module III: Statistical Techniques I:

Introduction: Measures of central tendency, Moments, Moment generating function (MGF) , Skewness, Kurtosis, Curve Fitting , Method of least squares, Fitting of straight lines, Fitting of second degree parabola, Exponential curves ,Correlation and Rank correlation, Regression Analysis: Regression lines of y on x and x on y, regression coefficients, properties of regressions coefficients and non linear regression.

Module IV: Statistical Techniques II:

Probability and Distribution: Introduction, Addition and multiplication law of probability, Conditional probability, Baye's theorem, Random variables (Discrete and Continuous Random variable) Probability mass function and Probability density function, Expectation and variance, Discrete and Continuous Probability distribution: Binomial, Poission and Normal distributions.

Module V: Statistical Techniques III:

Sampling, Testing of Hypothesis and Statistical Quality Control: Introduction , Sampling Theory (Small and Large) , Hypothesis, Null hypothesis, Alternative hypothesis, Testing a Hypothesis, Level of significance, Confidence limits, Test of significance of difference of means, T-test, F-test and Chi-square test, One way Analysis of Variance (ANOVA).Statistical Quality Control (SQC) , Control Charts , Control Charts for variables (\bar{X} and R Charts), Control Charts for Variables (p, np and C charts).

Text Books

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003(Reprint).
3. S. Ross: A First Course in Probability, 6th Ed., Pearson Education India, 2002.
4. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.

Reference Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
2. T. Veerarajan : Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi.
3. R.K. Jain and S.R.K. Iyenger: Advance Engineering Mathematics; Narosa Publishing House, New Delhi.
4. J.N. Kapur: Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.
5. D.N. Elhance, V. Elhance & B.M. Aggarwal: Fundamentals of Statistics; Kitab Mahal Distributers, New Delhi.

COURSE OUTCOMES

	Course Outcome (CO)	Bloom's Knowledge Level (KL)
At the end of this course, the students will be able to:		
CO 1	Remember the concept of partial differential equation and to solve partial differential equations	K ₁ & K ₃
CO 2	Analyze the concept of partial differential equations to evaluate the problems concerned with partial differential equations	K ₄ & K ₅
CO 3	Understand the concept of correlation, moments, skewness and kurtosis and curve fitting	K ₂
CO 4	Remember the concept of probability to evaluate probability distributions	K ₁ & K ₅
CO 5	Apply the concept of hypothesis testing and statistical quality control to create control charts	K ₃ & K ₆

K₁ – Remember, K₂ – Understand, K₃ – Apply, K₄ – Analyze, K₅ – Evaluate, K₆ – Create

Evaluation methodology to be followed:

The evaluation and assessment plan consists of the following components:

- Class attendance and participation in class discussions etc.
- Quiz.
- Tutorials and assignments.
- Sessional examination.
- Final examination.

Award of Internal/External Marks:

Assessment procedure will be as follows:

- These will be comprehensive examinations held on-campus (Sessionals).
- Quiz.
 - Quiz will be of type multiple choice, fill-in-the-blanks or match the columns.
 - Quiz will be held periodically.
- Tutorials and assignments
 - The assignments/home-work may be of multiple choice type or comprehensive type at least one assignment from each Module/Unit.
 - The grades and detailed solutions of assignments (of both types) will be accessible online after the submission deadline.
- Final examinations. These will be comprehensive external examinations held on-campus or off campus (External examination) on dates fixed by the Dr. APJ Abdul Kalam Technical University, Lucknow.

Technical Communication

(KAS301/401)

(Effective from the session 2019-20)

L T P
2 1 0

Unit -1 Fundamentals of Technical Communication:

Technical Communication: Features; Distinction between General and Technical Communication; Language as a tool of Communication; Dimensions of Communication: Reading & comprehension; Technical writing: sentences; Paragraph; Technical style: Definition, types & Methods; The flow of Communication: Downward; upward, Lateral or Horizontal; Barriers to Communication.

Unit - II Forms of Technical Communication:

Technical Report: Definition & importance; Thesis/Project writing: structure & importance; synopsis writing: Methods; Technical research Paper writing: Methods & style; Seminar & Conference paper writing; Expert Technical Lecture: Theme clarity; Analysis & Findings; 7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy, correctness, consideration, C.V./Resume writing; Technical Proposal: Types, Structure & Draft.

Unit - III Technical Presentation: Strategies & Techniques

Presentation: Forms; interpersonal Communication; Class room presentation; style; method; Individual conferencing: essentials: Public Speaking: method; Techniques: Clarity of substance; emotion; Humour; Modes of Presentation; Overcoming Stage Fear; Audience Analysis & retention of audience interest; Methods of Presentation: Interpersonal; Impersonal; Audience Participation: Quizzes & Interjections.

Unit - IV Technical Communication Skills:

Interview skills; Group Discussion: Objective & Method; Seminar/Conferences Presentation skills: Focus; Content; Style; Argumentation skills: Devices: Analysis; Cohesion & Emphasis; Critical thinking; Nuances: Exposition narration & Description; effective business communication competence: Grammatical; Discourse competence: combination of expression & conclusion; Socio-linguistic competence: Strategic competence: Solution of communication problems with verbal and non verbal means.

Unit - V Dimensions of Oral Communication & Voice Dynamics:

Code and Content; Stimulus & Response; Encoding process; Decoding process; Pronunciation Etiquette; Syllables; Vowel sounds; Consonant sounds; Tone: Rising tone; Falling Tone; Flow in Speaking; Speaking with a purpose; Speech & personality; Professional Personality Attributes: Empathy; Considerateness; Leadership; Competence.

Reference Books

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
2. Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
3. Spoken English- A Manual of Speech and Phonetics by R.K.Bansal & J.B.Harrison, Orient Blackswan, 2013, New Delhi.
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
5. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2014, Delhi.

6. Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.
7. A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi.
8. Skills for Effective Business Communication by Michael Murphy, Harvard University, U.S.
9. Business Communication for Managers by Payal Mehra, Pearson Publication, Delhi.

Course Outcomes

1. Students will be enabled to **understand** the nature and objective of Technical Communication relevant for the work place as Engineers.
2. Students will **utilize** the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
3. Students would imbibe inputs by presentation skills to **enhance** confidence in face of diverse audience.
4. Technical communication skills will **create** a vast know-how of the application of the learning to promote their technical competence.
5. It would enable them to **evaluate** their efficacy as fluent & efficient communicators by learning the voice-dynamics.