List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Electronics and Communication Engineering*

Programme Name : *B.Tech.*

Academic Year : 2019-20

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	EC01TBS01	Mathematics-II
02.	EC01TBS02	Chemistry
03.	EC01TES01	Programming for Problem Solving
04.	EC01TES02	Engineering Mechanics
05.	EC01PBS01	Chemistry Lab
06.	EC01PES01	Programming for Problem Solving Lab
07.	EC01PES02	Workshop Manufacturing & Practices
08.	EC01PES03	Engineering Mechanics Lab
09.	EC01PMC01	Induction Training Programme
10.	EC02TBS03	Physics
11	EC02TES01	Basic Electrical Engineering
12	EC02TBS04	Mathematics-I
13	EC02THS01	English
14	EC02TMC01	Environment Sciences
15	EC02PBS02	Physics Lab
16	EC02PES04	Basic Electrical Engineering Lab
17	EC02PES05	Engineering Graphics & Design Lab
18	EC03TPC01	Electronic Devices
19	EC03TPC02	Digital System Design
20	EC03TPC03	Signals and Systems
21	EC03TPC04	Network Theory
22	EC03TBS05	Mathematics-III
23	EC03THS02	Engineering Economics
24	EC03TMC02	Constitution of India
25	EC03PPC01	Electronics Devices Lab
26	EC03PPC02	Digital System Design Lab

27	EC04TPC05	Analog and Digital Communication
28	EC04TPC06	Analog Circuits
29	EC04TPC07	Microcontrollers
30	EC04TBS06	Numerical Methods
31	EC04TES05	Electronics Measurement & Instrumentation
32	EC04THS03	Effective Technical Communication
33	EC04PPC03	Analog and Digital Communication Lab
34	EC04PPC04	Analog Circuits Lab
35	EC04PPC05	Microcontrollers Lab
36	EC5TPC07	Lic & Its Application
37	EC5TPC08	Communication System- II
38	EC5TPC09	Electromagnetic Field Theory
39	EC5TPE01	Microprocessor & Its Application
40	EC5TPE02	Data Structure & Operating System
41	EC5TOE11	Computer Architecture
42	EC5TOE12	OOP in C++
43	EC5TOE13	Introduction to Information Security
44	EC5TOE14	Project Management
45	EC5TOE15	Rural Technology and Community Development
46	EC5PPC07	LIC & ITS APPLICATION Lab
47	EC5PPE01	Microprocessor & Its Application Lab
48	EC5PPC08	Communication System -II Lab
49	EC6TPC10	Digital Signal Processing
50	EC6TPC11	Antenna & wave prapogation
51	EC6TPE03	Data Communication & Computer Networking
52	EC6TPE04	Fundamental of VLSI Design
53	EC6T0E21	UNIX, Operating System
54	EC6T0E22	Probability & Stochastic Process
55	EC6TOE23	Advanced Instrumentation
56	EC6T0E24	Knowledge management
57	EC6T0E25	Engineering System Design Optimization
58	EC6PPE02	VHDL Lab
59	EC6PPC06	Digital Signal Processing Lab
60	EC6PSP01	Seminar
61	EC7TPC12	Microwave Engineering

62	EC7TPC13	Wireless Mobile Communication
63	EC7TPE05	Advance Hardware Design
64	EC7TPE06	Power Electronics
65	EC7TOE31	Wireless Sensor Network
66	EC7TOE32	Information theory and coding
67	EC7TOE33	Nanotechnology
68	EC7TOE34	Optical instrumentation and measurement
69	EC7TOE35	Neural Network and Fuzzy Logic
70	EC7TPPC12	Microwave Engineering Lab
71	EC7TPPE05	Comprehensive Viva
72	EC7PSP02	Project-I
73	EC8TPC14	Radar and Satellite Engineering
74	EC8TPC15	Optical Fiber Communication
75	EC8TPE07	VLSI Fabrication Methodology
76	EC8TOE41	Basic building block of Microwave Engineering
77	EC8TOE42	Principle of Management
78	EC8TOE43	Mobile Computing
79	EC8TOE44	Embedded System
80	EC8TOE45	Advanced Power Electronics
81	EC8TPPC15	Optical Fiber Communication Lab
82	EC8TPPC16	Advanced RF and Microwave Design lab
83	EC8TPSP03	Project-II
84	EC8TPSP04	Comprehensive Viva
85	ET7100	Research Methodology in engineering
86	EC102	Vaccume Technology
87	EC103	Finite Element Method
88	EC104	Sensors Measurement Science & Technology
89	EC105	Artificial Intelligence
90	EC106	Optimization Techniques
91	EC107	Antenna for Modern Wireless Communication
92	EC108	Wireless and Computer Network

विभागाध्यक्ष (इले. एवं संचार अभियांत्रिकी)
H.O.D. (Elect. & Comm. Engineering)
प्रौद्योगिकी संस्थान
Institute of Technology
गु. घा. वि., बिलासपुर (छ.ग.)
G. G. V. Bilaspur (C.G.)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC03THS02	3	0	0	3 hours	30	70	3

ENGINEERING ECONOMICS

Course Objectives:

Students will try to learn:

1. To Analyze Cost/Revenue Data And Carry Out Make Economic Analyses In The Decision Making Process
2. To Justify or Reject Alternatives/Projects On An Economic Basis.

UNIT - I: Basic Concepts and Definitions, Methodology of Economics, Demand and Supply – elasticity, Theory of the Firm and Market Structure, Price and output determinations in different types of market

UNIT - II: Public Sector Economics –Welfare economics, Central and commercial marks and their functions, Industrial policies, theory of localization, weber & surgent Florence theory, investment analysis-NPV, ROI, IRR, Payback period, SWOT analysis.

UNIT – III: Monetary and Fiscal Policy; Tools, impact on the economy, Inflation, Business Cycle, Cash Flow-2,3,4 Model.

UNIT – IV: Business Forecasting – Elementary techniques. Cost and Revenue Analysis, Capital Budget, Break Even Analysis.

UNIT – V: Indian economy; Urbanization, Unemployment–Poverty, Regional Disparities, Unorganized Sectors- Roll of Plans, Reforms-Post Independent period.

Text Books:

1. Mankiw Gregory N.(2002), Principles of Economics, Thompson Asia
2. V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
3. Misra, S.K. and Puri (2009), Indian Economy, Himalaya
4. Pareek Saroj (2003), Textbook of Business Economics, Sunrise Publishers

Recommended Books:

1. Kapila U. Indian economy since Independence. Academic Foundation, New Delhi
2. Misra, S. K. and Puri V. K. Indian Economy — Its Development Experience. Himalaya 3.Publishing House, Mumbai
3. Dutt R. and Sundharam K. P. M. Indian Economy. S. Chand & Company Ltd., New Delhi.
4. Mathur R. Indian Economic Policy and Reform. RBSA Publisher, Jaipur

Course Outcomes:

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

1. Aware of the basic theoretical framework underlying the field of Microeconomics, Macroeconomics, Indian Economy, Public Finance etc.
2. Understand the operations of money and banking and their interaction with the rest of the economy

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC04TPC05	3	1	0	4 hours	30	70	4

ANALOG AND DIGITAL COMMUNICATION

Course Objectives:

Students will try to learn:

1. The fundamentals of basic communication system, types of noise affecting communication system and noise parameters.
2. Need of modulation, modulation processes and different amplitude modulation schemes
3. Different angle modulation schemes with different generation and detection methods.
4. Various radio receivers with their parameters.
5. Need of sampling and different sampling techniques.
6. Generation and detection of pulse modulation techniques and multiplexing.
7. About theoretical bounds on the rates of digital communication system and represent a digital signal using several modulation methods

UNIT-I: Review of signals and systems, Frequency domain representation of signals, Principles of Amplitude Modulation Systems- DSB, SSB and VSB modulations. Angle Modulation, Representation of FM and PM signals, Spectral characteristics of angle modulated signals.

UNIT-II: Review of probability and random process. Gaussian and white noise characteristics, Noise in amplitude modulation systems, Noise in Frequency modulation systems. Pre-emphasis and De- emphasis, Threshold effect in angle modulation.

UNIT-III: Pulse modulation. Sampling process. Pulse Amplitude and Pulse code modulation (PCM), Differential pulse code modulation. Delta modulation, Noise considerations in PCM, Time Division multiplexing, Digital Multiplexers.

UNIT-IV: Elements of Detection Theory, Optimum detection of signals in noise, Coherent communication with waveforms- Probability of Error evaluations. Base band Pulse Transmission- Inter symbol Interference and Nyquist criterion. Pass band Digital Modulation schemes- Phase Shift Keying, Frequency Shift Keying, Quadrature Amplitude Modulation, Continuous Phase Modulation and Minimum Shift Keying.

UNIT-V: Digital Modulation tradeoffs. Optimum demodulation of digital signals over band-limited channels- Maximum likelihood sequence detection (Viterbi receiver). Equalization Techniques. Synchronization and Carrier Recovery for Digital modulation.

Text/ReferenceBooks:

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.

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC04TPC06	3	0	0	3 hours	30	70	3

ANALOG CIRCUITS

Course Objectives:

Students will try to learn:

1. To understand the operation of the various bias circuits of MOSFET and Analyze and design MOSFET bias circuits.
2. To understand the operation and design of multistage. amplifier for a given specification.
3. To understand the operation and design of transformer coupled various types of power amplifier circuits.
4. To understand the effects of negative feedback on amplifier circuits.
5. To analyze the different RC and LC oscillator circuits to.
6. To determine the frequency of oscillation

UNIT-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.

UNIT-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.

UNIT-III: Oscillators: Review of the basic concept, Barkhausen criterion, RC Oscillators (Phase shift, Wein Bridge etc.), LC oscillators (Hartley, Colpitt, Clapp etc.), Non sinusoidal oscillators, Current mirror: Basic topology and its variants, V-I Characteristics, Output resistance and minimum sustainable voltage (VON), maximum usable load.

UNIT-IV: 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. 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.

UNIT-V: Digital-to-analog converters (DAC): 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.

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC04TPC07	3	0	0	3 hours	30	70	3

MICROCONTROLLERS

Course Objectives:

Students will try to learn:

1. To develop background knowledge and core expertise of microcontroller.
2. To know the importance of different peripheral devices and their interfacing to microcontrollers.
3. To know the design aspects of microcontrollers.
4. To write assembly language programs of microcontrollers for various applications.

UNIT-I: Overview of microcomputer systems and their building blocks, types of microprocessor, Multiplexing concept of buses, buffer.

UNIT-II: Introduction to 8085, bus architecture, pin diagram, demultiplexing of buses, Instruction set of 8085.

UNIT-III: Stack, stack related instructions, concept of interrupts, Direct memory access, Memory interfacing.

UNIT-IV : Interfacing with peripherals - timer, serial I/O, parallel I/O, A/D and D/A converters; Arithmetic Coprocessors; System level interfacing design; Concepts of virtual memory, Cache memory,

UNIT-V: Advanced coprocessor Architectures- 8086, 286, 486, Pentium; Microcontrollers: 8051 systems, Introduction to RISC processors; ARM microcontrollers interface designs.

Text/Reference Books:

1. R. S. Gaonkar, Microprocessor Architecture: Programming and Applications with the 8085/8080A, Penram International Publishing, 1996
2. D A Patterson and J H Hennessy, "Computer Organization and Design The hardware and software interface. Morgan Kaufman Publishers.
3. Douglas Hall, Microprocessors Interfacing, Tata McGraw Hill, 1991.
4. Kenneth J. Ayala, The 8051 Microcontroller, Penram International Publishing, 1996.

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

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC04TBS06	3	1	0	4 hours	30	70	4

NUMERICAL METHODS

Course Objectives:

Students will try to learn:

1. To understand the method of solving algebraic, transcendental equations.
2. To determine the approximate value of the derivative & definite integral for a given data using numerical techniques.

UNIT- I : Introduction of Errors and their Analysis, types of errors, numerical problems on error analysis, curve fitting: method of least squares, fitting of exponential curves$y = ae^{bx}$, fitting of the curve$y = ab^{x}$, fitting of the curve$y = ax^{b}$.Method of moments

UNIT- II: Numerical Solution of Algebraic and Transcendental Equations: Graphical method bisection Method, Secant Method, Regula-falsi Method, Newton Raphson Method, Solution of a system of simultaneous linear algebraic Equations Direct methods: Gauss elimination Method, Gauss Jordan method, Iterative methods .Jacobi Iterative Method, Gauss Seidel Iterative method.

UNIT- III : The Calculus of Finite Differences: Finite differences, Difference formula, operators and relation between operators. Inverse Operator, Interpolation with equal intervals: - Newton's forward and backward interpolation formula. Interpolation with Unequal intervals: - Lagrange's interpolation Newton's difference formula, inverse interpolation.

UNIT- IV : Numerical Differentiation and Integration: - Numerical Differentiation Newton's forward and Backward difference interpolation formula. Maxima and Minima of aTabulated function, Numerical Integration :-Trapezoidol rule, simpson's (1/3) rd and (3/8) th rule, Boole's rule, weddle rule.
Difference Equations: Definition ,order and degree of a difference equation, Linear difference equations, Difference equations reducible to Linear form, simultaneous difference equations with constant coefficients.

UNIT- V : Numerical solution of ordinary differential equation : Taylor series method, Euler's method, Modified Euler method Runge's method Runge-Kutta method, numerical method for solution of partial differential equations. General linear partial differential equation. Laplace equation and Poisson equation.

Books Recommended:

1. JAIN & IYNGAR Numerical Methods for Scientific and Engineering Computations.
2. RAO G.S. Numerical Anlysis.
3. Grewal B S Numerical Methods In Engineering and Science.
4. Das K K Advance Engineering Methods.
5. Rajaraman V Computer Oriented Numerical Methods
6. P. Kandasamy K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
7. S. S. Sastry, Introduction methods of Numerical Analysis, PHI, 4th Edition, 2005.

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC04TES05	3	0	0	3 hours	30	70	3

ELECTRONICS MEASUREMENT & INSTRUMENTATION

Course Objectives:

Students will try to learn:

1. To explain basic concepts and definitions in measurement.
2. To describe the bridge configurations and their applications.
3. To elaborate discussion about the importance of signal generators and analyzers in Measurement.

UNIT – I: Measurements and Measurement system: Measurements, Significance of measurement, Methods of measurement- Direct and Indirect Method. Instruments and measurement system: Mechanical, Electrical, Electronic instruments; Classification of Instruments: Deflection and null type instruments. Analog and Digital mode of Operation, Application of measurement system, Characteristics of instrument and measurement system: static & dynamic; Elements of a Generalized Measurement System: Primary Sensing Element, Variable Conversion Element, Data presentation Element. Accuracy and precision, Significant figure, types of error, gross error, systematic error- Instrumental, Environmental, Observational Errors, Random error, Probability of error, Probable Error- of a finite number of readings, for combination of components, Limiting error.

UNIT –II: Electromechanical Indicating Instruments: Operating forces, Constructional Details, Types of Support, Torque/Weight Ratio, Control system, Damping- Air friction and Eddy current damping. D´Arsonaval Galvanometer- construction, Torque Equation, Dynamic Behavior, Undamped, Damped, Overdamped Motion, Response of Galvanometer. Ballistic Galvanometer. PMMC- Construction, Torque Equation, Voltage/Current Measurement: Ammeter, Voltmeter, Ohmmeter, Multimeter (V.O.M.), Ratiometer, Megger. High frequency Measurement: Q-meter

UNIT – III: AC Bridge: Introduction, Sources and Detectors, General equation for bridge balance, General form of AC Bridge. Maxwell´s Bridge, Hay´s bridge, Anderson´s bridge, De-Sauty´s bridge, Schering bridge, Wien´s bridge. **Electronic Instruments:** Introduction, Advantage of Electronic voltmeter, VTVM, Differential voltmeter, Electronic voltmeter using rectifier, True RMS reading voltmeter, Calorimeter power meter.

UNIT – IV: Transducers: Classification of transducer, Primary & Secondary, Passive & Active, Analog & Digital, Potentiometer, loading effect, Strain Gauge, Thermistor, Construction of thermistor, Thermocouple, LVDT, Advantage & Disadvantage of LVDT, RVDT, Capacitive Transducer, Piezo-electric transducer, Hall-effect Transducer, Capacitive Transducer, Pressure Transducer.

UNIT – V: Display devices: Digital display method, Segmental display- 7segment & 14 segment display, dot matrix, LED, LCD, TFT, Plasma display, DLP. **Digital voltmeter (DVM):** Types of DVM, Ramp type DVM, Integrating type DVM, Potentiometer type (non-integration type). **Recorders:** Analog Recorder, Null type Recorder, Single point Recorder, Graphical strip chart, X-Y recorders, Magnetic tape recorder, FM recorder.**CRO:** Introduction, Oscilloscope block diagram, CRT, Functional block diagram of sampling, Storage, Dual trace and dual beam oscilloscope.

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC04THS03	3	0	0	3 hours	30	70	3

EFFECTIVE TECHNICAL COMMUNICATION

Course Objectives:

Students will try to learn:

1. To participate actively in writing activities (individually and in collaboration)
2. To understand how to apply technical information and knowledge in practical documents
3. To practice the unique qualities of professional writing style, including sentence conciseness, readability, clarity, accuracy, honesty, avoiding wordiness or ambiguity, previewing.
4. To recognize, explain, and use the genres of technical communication: technical abstracts, data based research reports, instructional manuals, technical descriptions, and web pages
5. To recognize and develop professional format features in print, html, and multimedia modes, as well as use appropriate nonverbal cues and visual aids.

UNIT-I: 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.

UNIT-II: 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.

UNIT-III: 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

UNIT-IV: 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.

UNIT-V: 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, NewYork, 2004.
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TPC07	3	1		3 hours	40	60	4

Course Objective

1. To understand the concepts, working principles and key applications of linear integrated circuits.
2. To perform analysis of circuits based on linear integrated circuits
3. To design circuits and systems for particular applications using linear integrated circuits.

LIC & ITS APPLICATIONS

UNIT – I

Basic Building Blocks for ICs & OPAMP: Basic Differential Amplifiers & Analysis, Introduction to OPAMP, Ideal OPAMP Characteristics, OPAMP ICs:741Pin Diagram and Pin Function, Inverting Amplifier, Non-Inverting Amplifier, Definition of OPAMP Parameters, Frequency Response of OPAMP, Open Loop & Closed Loop Configuration of OPAMP and its Comparisons, Voltage Comparator, Zero Crossing Detector, Level Detector.

UNIT – II

Applications of OPAMP: Introduction, Adder, Substractor/Difference Amplifier, Voltage Follower, Integrator, Differentiator, Comparator IC such as LM339, Window detector, Current to Voltage and Voltage to Current Converter, Instrumentation Amplifier, Precision Half Wave Rectifier, Precision Full Wave Rectifier, Log & antilog amplifier, Schmitt Trigger, Bridge Amplifier, Peak Detectors/Peak follower, Sample-and- Hold Amplifiers, Square wave generator, Saw-tooth wave generator, Triangular wave generator, Astable multivibrator, Monostable multivibrator, Dead Zone circuit- with positive output, with negative output, Precision clipper circuit, Generalized Impedance Converter (GIC) and its application.

Frequency response of OPAMP: Open loop voltage gain as a function of frequency, Unity gain Bandwidth, Close loop frequency response, Slew Rate.

UNIT – III

Active filters & PLL - Introduction to Filters, Merits & Demerits of active filters of over Passive Filter, Classification of filters, Response characteristics of Filter, First Order and Second Order active high pass, Low pass, Band pass and band reject Butterworth filters.

Phase Lock Loop: Operating Principle of the PLL, Linear Model of Phase Lock Loop, Lock Range and Capture Range, Application of the PLL. Voltage Controlled Oscillator(VCO).

UNIT – IV

D/A and A/D converters & Analog Multiplier: D/A converter - Ladder, R-2R, A/D converters- Ramp, Continuous conversion, Flash ADC, Dual slope ADC, Successive Approximation, Voltage to Time converters. Timing and circuits comparisons, DAC/ADC specifications.

Analog Multiplier: Basic Analog Multiplication Techniques, Applications of Multiplier- Frequency doubling, Phase-angle difference detection, Voltage dividing action, Square root of a signal, Function realization by Multiplier, Amplitude Modulator, Standard Modulator Circuit, Demodulation of AM signal.

UNIT – V

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TPC08	3	1		3 hours	40	60	4

Course Objectives:

- To understand the key modules of digital communication systems with emphasis on digital modulation techniques.
- To get introduced to the concept and basics of information theory and the basics of source and channel coding/decoding.

COMMUNICATION SYSTEM – II

UNIT – I

Pulse Modulation: Sampling theorem, Basic principles of PAM, PWM and PPM, TDM, comparison of TDM with FDM; Typical multiplexed systems.

Pulse Code Modulation: Pulse code modulation, generation and detection of PCM, quantization, companding, A-Law and μ-Law, differential PCM; Delta modulation, Adaptive delta modulation.

UNIT – II

Digital Modulation Techniques: Introduction – Pass band Transmission model- Generation, Detection of BPSK, DPSK, DEPSK, QPSK, M-Ary PSK, QASK, BFSK, MSK, Duo- Binary Encoding, QAM.

UNIT – III

Optimal reception of digital signal: Performance of Digital Modulation Systems, S/N ratio of PCM and DM, Comparison of PCM and DM. pulse shaping of baseband signal, Equalization principles, ISI, Optimum Filter, Matched Filter, Error Probability of Various digital modulation Technique.

UNIT – IV

Information Theory: The concept of Information, average information, Entropy; Marginal, Conditional and Joint Entropies, Information rate , Shannon's theorm, Channel capacity, Bandwidth S/N tradeoff, Discrete communication channels, Shannon's limit, mutual information and channel capacity, Continuous communication channels, Channel with finite memory, Discrete memory less channels.

UNIT – V

Coding: General principles of coding, necessary and sufficient condition for noiseless coding, Coding efficiency, Shannon-Fano and Huffman coding; Error control, Hamming codes, Linear block codes, Cyclic codes, Convolutional codes - Viterbi Algorithm, Trellis coded Modulation.

SUGGESTED BOOKS & REFERENCE:-

1. Principles of Communication Systems –Taub and Shilling, Tata Mc Graw Hill.
2. Communication Systems –Simon Haykins. Tata McGraw Hill
3. Principles of Digital Communication Systems, B.P. Lathi, PHI
4. Principles of Digital Communications, Das, Mullick and Chatterjee, Wiley Eastern Publications.
5.Digital and Analog Communication Systems: K.Sam Shanmugam, John Wiley
6. Microelectronic Circuits: Sedra and Smith 6th edition, Oxford University Press.

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TPC09	3	1		3 hours	40	60	4

Course objective

1. To acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission, propagation and reception of electro- magnetic wave systems
2. To identify, formulate and solve fields and electromagnetic waves propagation problems in a multidisciplinary frame individually.
3. To provide the students with a solid foundation in engineering fundamentals required to solve problems and also to pursue higher studies

ELECTROMAGNETIC FIELD THEORY

UNIT-I

INTRODUCTION: Review of vector analysis, Scalar & vector products, Coordinate systems and Transformation amongst rectangular, cylindrical and spherical co-ordinate system, Line, Surface and Volume Integral, Gradient of a Scalar, Divergent and Curl of a vector, Divergence Theorem, Stoke´s Theorem, Laplacian of a Scalar.

UNIT-II

Electrostatics: Coulomb's law, electric field intensity from point charges, field due to continuous distribution of charges, Electric Flux density, Gauss's law, Electric displacement and displacement density, Electric Potential, Potential field of a point charge, Laplace and Poison's equation.

Magnetostatics: Biot-Savart´s law, Ampere's circuital law and its Application, Magnetic flux density, Magnetic Scalar and Vector potential, Magnetic Energy stored.

UNIT-III

Time Dependent Field: Ampere's work law in differential work form, continuity of currents, Conduction and displacement currents, Maxwell's equation and their interpretations, Boundary conditions.

Energy Flow And Poynting Vector: Pointing theorem, interpretation of ExH.Simple application, complex pointing vector.

UNIT-IV

Wave equations, Sinusoidal time varying fields, uniform plane wave in dielectric and conductor media, Skin effect and depth of penetration, Reflection and refraction of plane waves at boundaries for normal and oblique incidence surface impedence.

UNIT-V

Transmission Lines: Transmission line theory from the circuit concept, Properties, Constants, Transmission line equations, Infinite line, Reflections in Transmission lines, Voltage Current and Impedance relations- Open and short circuit lines, Experimental determination of line constants, Standing wave ratio, Impedance matching, Quarter and half wave lines, Single stub and double stub matching, Circle diagram, Smith chart.

SUGGESTED BOOKS & REFERENCE:-

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TPE01	3	0		3 hours	40	60	3

Course Objective

1. Introduce the concept of microprocessor and its history and evolution with integration technology.
2. Introduce the concept of interfacing and also assembly language programming in 8085 and 8086.
3. Introduce the concept of architecture of microprocessor.

MICROPROCESSOR & ITS APPLICATION

UNIT – I

Microprocessor architecture and Microcomputer systems: History And Evolution, Types Of Microprocessors, Functions of Microprocessor, Architecture of 8085, Pin configuration and Function, Tristate Bus concept, Generation of Timing Signals, Bus Timing, Demultiplexing, Instruction execution, Instruction cycle, Machine cycles, T states, Fetch executes cycle, Instruction Timing and Operation status.

UNIT – II

Memory map & addresses, I/P devices ,I/P Addressing, The 8085 Programming model, Instruction Classification, Instruction & Data Formats, Addressing Modes, Instruction for data transfer, Arithmetic and Logical operation, Branching operation, Addressing mode, Writing Assembly Language Programs.

Counters, Time Delays And interrupts: Memory interfacing, Absolute, Partial Decoding, Multiple Address Range, Interfacing memory with wait states, Interfacing I/O devices, Peripheral I/O, Memory Mapped I/O, 8085 Single Board Microcomputer System. Interfacing Of 8085 with 8155/8156(RAM), 8355/8755(ROM).

UNIT – III

Programming Techniques with additional instructions, Looping, counting and indexing, Data transfer from/to memory to/from microprocessor, 16-bit arithmetic instructions, Logic Operations like rotate, compare, Time delays, Counters, Stacks, Subroutine, Call and return instructions. Interrupts, The 8085 interrupt process, multiple interrupt and priorities, Vectored interrupts. Restart as software instruction.

UNIT – IV

Programmable Interfacing devices: Basic Concept, 8279 programmable Keyboard/Display interface,8255A Programmable Parallel interface, Interfacing keyboard and display using 8255A, 8254 Programmable Interval Timer, 8259A Programmable Interrupt Controller, Direct Memory Access(DMA), 8237 DMA Controller. Basic Concept in Serial I/O, Data Communication over Telephone Lines, 8085-serial I/O lines, 8251A Programmable Communication interface, Interfacing a matrix keyboard, Interfacing LED and seven segment displays.

UNIT –V

Introduction of 16-bit Microprocessor: Internal organization of 8086, Signal descriptions, Physical memory organization, Minimum & Maximum mode, Bus Organization and timing. Addressing modes, Instruction set, Assembler directives, Interrupts and Interrupt service routine.

SUGGESTED BOOKS & REFERENCE:-

1. *"Microprocessor Architecture, Programming & Applications with the 8085",R.S.Gaonkar, Penram Publication.*
2. *"Advance Microprocessor & Peripherals", A K Rai , K M Bhurchandi, TMH*
3. *"The Intel Microprocessor", Barray B. Brey, PHI*

ELECTRONICS & COMMUNICATION ENGINEERING Effective From 2017-18 (CBCS)

Sub Code	L	T	P	Duration	IA	ESE	Credits
EC5TPE02	3	0		3 hours	40	60	3

Course Objective:

1. To introduce the concept of Data Structure.
2. To introduce operating system as a resource manager, its evolutions and fundamentals.
3. To help student understand concept of process and different process (linear and concurrent) Scheduling policies.
4. To help student familiar with memory, file and I/O management policies.

DATA STRUCTURE & OPERATING SYSTEM

UNIT – I

Data structure: Introduction, classification, operations, algorithm analysis.
Array: insertion, deletion, searching, sorting. Dynamic memory allocation.

UNIT - II

Linked List: Singly, Doubly and their operations, **Stack:** Basic Operation, Conversion of infix notation using
stack, evaluation of postfix expression, recursion, **Queue:** Basic Operation, Circular & Linear Queue.

UNIT - III

Tree: Introduction, binary tree traversal, binary search tree and their operations.
Graph: Representation of graph, shortest path, graph traversal, spanning tree, minimum spanning tree.

UNIT - IV

Operating System Overview: Operating system objectives and functions, evolution of operating system, System calls.
Process Management: Process concepts, CPU scheduling, Deadlocks, Deadlock detection, prevention and recovery.

UNIT - V

Memory Management: Swapping, Contiguous allocation, Paging, Segmentation, Virtual memory, Demand paging, Page replacement policies, Thrashing.
Disk Management: Free space management, Disk management, Disk scheduling.

SUGGESTED BOOKS & REFERENCE:-

1. *Data Structures, Seymour Lipschutz, Schaum's Series, Tata McGraw Hill Publication.*
2. *Operating System, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Tata McGraw Hill Publication.*
3. *Data Structure Using C, Aaron M. Tanenbaum, Pearson Publication.*
4. *Operating Systems, William Stallings, Pearson Education.*

Subject outcomes:

1) To Learn linear data structures – lists, stacks, and queues
2) To understand sorting, searching and different algorithms
3) To apply Tree and Graph structures

And also familiar with the operating system and memory concept and process management.