Scheme of Instruction & Examination
B. E. SECOND YEAR, III SEMESTER
ELECTRICAL AND ELECTRONICS ENGINEERING
Semester - III

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			Hours per week				Maximum Marks		
			L	T	P/D	Duration in Hrs	CIE	SEE	
Theory Courses									
1	4BS303HS	Numerical Methods and Fourier Series	3	1	-	4	40	60	4
2	4PC301EE	Electro Magnetic Fields	3	-	-	3	40	60	3
3	4PC302EE	Electrical Circuits-I	3	-	-	3	40	60	3
4	4ES304CS	Programming for Problem Solving	3	-	-	3	40	60	3
5	4PC303EE	Analog and Digital Electronics	3	-	-	3	40	60	3
6	4HS302HS	Human Values & Professional Ethics	2	-	-	2	40	60	2
7	4MC302HS	Essence of Indian traditional knowledge	2	-	-	2	40	60	-
Laboratories									
8	4PC351EE	Analog and Digital Electronics Lab	-	-	2	2	40	60	1
9	4ES354CS	Programming for Problem Solving Lab	-	-	2	2	40	60	1
		Total	**19**	**1**	**4**	**24**	**360**	**540**	**20**

HS: Humanities and Social Sciences BS: Basic Science ES: Engineering Science MC: Mandatory Course PC: Professional Core
L:Lecture T:Tutorial P:Practical D:Drawing
CIE: Continuous Internal Evaluation SEE: Semester End Evaluation (Univ.Exam) EE: Electrical Engg.

Note:
1. Each contact hour is a clock hour.
2. The duration of the practical class is two hours, however it can be extended wherever necessary, toenable the student to complete the experiment.

Course Code	Course Title	Core/Elective					
4BS303HS	NUMERICAL METHODS AND FOURIER SERIES	Core					
		L	T	P/D	Credits	CIE	SEE
		3	1	-	4	40	60

Prerequisite : Basic Differentiation, Integration and Trigonometric results.

COURSE OBJECTIVES :

The objective of this course is to make the student

1. To learn an alternative methods and analytical methods in mathematical concepts.
2. To apply numerical techniques in solving ordinary differential equations.
3. To study Interpolation and numerical methods to fit a curve
4. To study Fourier series and its applications to partial differential equations.

COURSE OUTCOMES:

After completion of the course, the student will be able to

1. Find the solution of algebraic and transcendental equations using numerical methods.
2. Apply numerical techniques to solve ordinary differential equations and definite integrals.
3. Apply numerical methods to interpolate values and fit different curves from given data.
4. Expand function as a Fourier series.
5. Apply the solution of partial differential equations to physical problems.

UNIT-I :

Numerical Solutions of Algebraic and Transcendental Equations: Introduction, Bisection Method, Regula-False method, Iteration method and Newton Raphson method. Solving linear system of equations by Gauss-Jacobi and Gauss-Seidel method.

UNIT-II :

Numerical integration: Trapezoidal Rule, Simpson's 1/3rd and 3/8th Rule.

Numerical solutions of Ordinary Differential Equations: Solution of ordinary differential equations by Taylor's Series, Picard's method of Successive approximations, Euler?s and Modified Euler?'s methods, Fourth Order Runge-Kutta Method.

UNIT - III :

Interpolation: Lagrange's interpolation, Newton's divided difference interpolation, Newton's Forward and Backward difference interpolations

Curve Fitting: Fitting a linear, second degree, exponential curve by method of least squares for the discrete data.

UNIT - IV :

Fourier Series: Fourier series, Fourier series expansions of even and odd functions, convergence of Fourier series, and Fourier half range series.

UNIT - V:

Applications to Partial Differential Equations: Classification of linear second order partial differential equations, separation of variables method (Fourier method) , Fourier series solution of one dimensional heat and wave equations, Two dimensional Laplace's equation.

TEXT BOOKS :

1. Dr.B.S Grewal, Higher Engineering Mathematics, 45th Edition, Khanna Publishers. (Unit 1-5)
2. B.V.Ramana,Higher Engineering Mathematics,3rd Edition 2015
3. Computation, 6th Edition, New Age International Publishers. 2020-2021 (Unit 1-3)
4. S.S.Sastry, Introductory Methods of Numerical Analysis, 5th Edition, PHI Learning Pvt. Ltd. (Unit 1-3)

REFERENCES/SUGGESTED READING :

1. R K Jain & S R K Iyengar, Advanced Engineering Mathematics, 5th Edition, Narosa Publishers, 6th Edition, 2021
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, 2012.

Course Code	Course Title	Core/Elective					
4PC301EE	ELECTROMAGNETIC FIELDS	Core					
		L	T	P/D	Credits	CIE	SEE
		3	-	-	3	40	60

Prerequisite : Basics of electric field theory, magnetic field theory and electromagnetic waves.

COURSE OBJECTIVES :

The objective of this course is to make the student

1. To gain conceptual and basic mathematical understanding of electric and magnetic fields in free space and inmaterials.
2. To understand the coupling between electric and magnetic fields through Faraday's law, displacement currentand Maxwell's equations.
3. To understand wave propagation in lossless and in lossy media.
4. To be able to solve problems based on the above concepts.

COURSE OUTCOMES :

After completion of the course, the student will be able to

1. Understand the vector calculus for electromagnetism.
2. Apply the electric fields for simple configurations under static conditions
3. Analyze the static magnetic fields.
4. Analyze Electrical Circuits with the concept of magnetic field.
5. Understand Maxwell's equation in different forms and different media.
6. Understand the propagation of EM wave.

UNIT - I

Review of Vector Analysis

Vector algebra-addition, subtraction, components of vectors, scalar and vector multiplications, triple products, three orthogonal coordinate systems (rectangular, cylindrical and spherical). Vector calculus-differentiation, partial differentiation, integration, vector operator del, gradient, divergence and curl, integral theorems of vectors. Conversion of a vector from one coordinate system to another, stokes theorem.

UNIT - II

Electrostatics-I: Coulomb's law, Electric field intensity, Electrical field due to point charges. Line, Surface and Volume charge distributions. Gauss law and its applications. Absolute Electric potential, potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density, dipole, dipole moment, potential due to dipole, polarization, numerical problems

UNIT - III

Electrostatics-II: Current and current density, Ohms Law in Point form, Continuity of current, Boundary conditions of perfect dielectric materials. Permittivity of dielectric materials, Capacitance, Capacitance of a two wire line, Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation, Application of Laplace's and Poisson's equations with single variable, numerical problems.

UNIT - IV

Magneto statics-I: Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors, Force on a moving charge, Force on a differential current element, Force between differential current elements, Nature of magnetic materials, Magnetization and permeability, Magnetic boundary conditions, Magnetic circuits, inductances and mutual inductances, Faraday's law for Electromagnetic induction, numerical problems

UNIT - V

Magneto statics-II & Electromagnetic waves: Integral & differential form of Maxwell's equations, Motional Electromotive forces. Electrical and Magnetic boundary conditions, Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form Wave equation in Phasor form, Plane waves in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors, Skin effect. Poynting theorem

TEXT BOOKS :

1. M. N. O. Sadiku, "Elements of Electromagnetics", Oxford University Publication, 2014 (Unit 1-5).

2. Pramanik, "Electromagnetism - Theory and applications", PHI Learning Pvt. Ltd, New Delhi, 2009 (Unit 1-5)
3. W.J. Duffin, "Electricity and Magnetism", McGraw Hill Publication, 1980 (Unit 1-5).
4. W. Hayt, "Engineering Electromagnetics", McGraw Hill Education, 2012 (Unit 1-5)

REFERENCES/SUGGESTED READING :

1. A. Pramanik, "Electromagnetism-Problems with solution", Prentice Hall India, 2012.
2. G.W. Carter, "The electromagnetic field in its engineering aspects", Longmans
3. W.J. Duffin, "Advanced Electricity and Magnetism", McGraw Hill, 1968.
4. E.G. Cullwick, "The Fundamentals of Electromagnetism", Cambridge University
5. B. D. Popovic, "Introductory Engineering Electromagnetics", Addison-Wesley Educational Publishers, International Edition, 1971.

Course Code	Course Title	Core/Elective					
4PC302EE	ELECTRICAL CIRCUITS -I	Core					
		L	T	P/D	Credits	CIE	SEE
		3	-	-	3	40	60

Prerequisite : Basics of networks, circuits, and Semiconductors devices.

COURSE OBJECTIVES :

The objective of this course is to make the student

1. Familiarize with AC fundamentals and solve electrical circuits when excited by AC Supply.
2. Understand the concept of electrical resonance and network theorems for reducing complex networks.
3. Familiarize with three phase AC fundamentals and measure active and reactive power.
4. Understand the concept of transients and its analysis in electrical circuits.
5. Familiarize with the concept of network parameters and its calculations.

COURSE OUTCOMES :

After completion of the course, the student will be able to

1. Understand and analyze the electrical circuit when excited with AC supply
2. Explain electrical resonance and analyze complex electrical circuits with the help of different networktheorems
3. Understand and explain the fundamentals of three phase AC supply
4. Apply the concepts of Magnetic circuits and Analyze them
5. Analyze electrical circuits under transient conditions

UNIT-I

Single Phase A.C. Circuits: R.M.S. and Average values for different periodic wave forms, J-notation, Complex and Polar forms of representation, Steady State Analysis of R, L and C (in Series, Parallel and Series Parallel Combinations) with Sinusoidal Excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Phase and Phase difference, Concept of Power Factor, Real and Reactive powers, Complex power.

UNIT - II

Resonance & Network Theorems for AC Excitations: Resonance-Series and Parallel Resonance, Bandwidth and Q- factor, Theorems-Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorems.

UNIT - III

Three-Phase AC Circuits: Phase sequence- Star and delta connection, Relation between line and phase voltages and currents in balanced systems, Analysis of balanced and unbalanced 3 phase circuits-Measurement of active and reactive power.

UNIT - IV

Magnetic Circuits: Introduction, Self and Mutual Inductance, Dot Convention, Coefficient of coupling, Analysis of magnetic circuits, comparison of Electrical and Magnetic circuits, numerical.

UNIT - V

D.C & A.C Transient Analysis: Transient response of R-L, R-C, R-L-C circuits (Series and parallel combination) for D.C and

A.C excitation-Initial conditions, solution method using differential equation and Laplace transforms.

TEXT BOOKS :

1. Fundamentals of Electric Circuits, Charles k. Alexander and Matthew N. O. Sadiku, Tata McGraw Hills Education, Edition 3, 2013.(Unit 1-3)
2. Electrical Circuit Analysis, William H Hayt and Jack Kemmerly , 8th Edition, 2014 (Unit 1-3)
3. Circuit Theory Analysis and Synthesis by Abhijit Chakrabarti, Dhanpat Raj & Co., 2018.(Unit 1-3

REFERENCES/SUGGESTED READING :

1. Fundamentals of Electrical Engineering and Electronics", J.B. Gupta, S. K. Kataria & Sons Publications, 2002.
2. C L Wadhwa, "Electrical Circuit Analysis including Passive Network Synthesis", New Age International, 2 nd Edition, 2009.
3. David A Bell, "Electric circuits", Oxford University Press, 7th Edition, 2009.
4. E Hughes, "Electrical and Electronics Technology", Pearson Education, 2010.

Course Code	Course Title	Core/Elective					
4ES304CS	PROGRAMMING FOR PROBLEM SOLVING	Core					
		L	T	P/D	Credits	CIE	SEE
		3	-	-	3	40	60

Prerequisite: Mathematical Knowledge, Logical and Analytical Thinking.

COURSE OBJECTIVES :

The objective of this course is to make the student

1. To introduce the basic concepts of Computing environment, algorithms and flowcharts.
2. To acquire knowledge about the basic concept of writing a program.
3. To understand modular and structured programming constructs in C.
4. To learn the usage of structured data types, data handling and memory management using pointers.

COURSE OUTCOMES :

After completion of the course, the student will be able to

1. Formulate algorithms and learn fundamental program methodologies of C programming.
2. Understand control statements and interpret derived data types with mathematical and engineering problems.
3. Develop modular programming techniques to solve searching, sorting and file system problems
4. Recognize pre-processor directives and user defined usage.

UNIT – I

Introduction to Computers: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). Algorithm, Flowchart / Pseudo code with examples Introduction to C Language: History of C, Features, Structure of C program, Character set, Tokens ,Variables, Data types, I/O statements, Type conversion Syntax and Logical Errors in compilation, object and executable code.

UNIT – II

Operators and Control Structures: Operators, Operator precedence, Arithmetic expressions, Conditional Branching and Loops, Writing and valuation of conditionals and consequent branching.

Arrays: Arrays (1-D, 2-D), Strings and its library functions.

UNIT – III

Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble and Selection).

Functions: Functions, storage classes, Parameter passing techniques Passing arrays to functions, Recursion Concept, Command line arguments.

UNIT – IV

Pointers: Idea of pointers, Defining pointers, array of pointers, pointer arithmetic, dynamic memory allocation, Structure: Structures, Defining structures and Array of Structures, self – referential structures, Unions concept, Functions and structures, Enum, Bit fields.

UNIT – V

Pre-processor Directives: File Inclusion, Macros Substitutions, Conditional Compilation.

File Handling: Introduction to File Handling, Types of files, File operations, File input/output statements.

TEXT BOOKS:

1. Computer Science A structured programming approach using C, Behrouz A. Forouzan and Richard F. Gilberg , Cengage Learning , 2007 , Third Edition(Unit 1-5).
2. Schaum's Outline of Programming with C, Byron Gottfried, McGraw-Hill ,2019, Fourth Edition.
3. Data Structures and Program Design in C, Robert Kruse, Bruce Leung, Tondo, Pearson, II Edition.

REFERENCES/SUGGESTED READING

1. C Programming Language, Brian W Kenningham, Dennis M Ritchie, Pearson, II Edition
2. How to solve it by Computer, R G Dromey, Pearson Edition

Course Code	Course Title	Core/Elective					
4PC303EE	ANALOG AND	Core					
	DIGITAL	L	T	P/D	Credits	CIE	SEE
	ELECTRONICS	3	-	-	3	40	60

Prerequisite : Basics of networks, number systems

COURSE OBJECTIVES :

The objective of this course is to make the student

1. Understand the concept of transistors and analyze the feedback oscillators.
2. Study and understand the various power amplifiers, operation of OPAMP and its applications.
3. Apply combinational digital circuits for logic functions.
4. Analyze Logic gates, memory flip-flops, arrays, and programmable logic.
5. Design tools, both manual and computerized, for design, optimization, and test of logic circuits.

COURSE OUTCOMES :

After completion of the course, the student will be able to

1. Illustrate the characteristics of various power amplifiers, operation of OPAMP and its applications
2. Understand the concept of transistors and feedback oscillators
3. Understand various logic gates and use the logic gates for combinational digital circuits and logic functions
4. Understand sequential logic circuits and analyze the same
5. Understand various A/D and D/A converters and programmable logic devices and arrays.

UNIT-I

Transistors: BJT VI characteristics, JFET VI characteristics small signal model of BJT and JFET, analysis of BJT as amplifier, estimation of voltage gain, current gain, input resistance, output resistance . **Transistor biasing:** fixed bias, collector bias, self- bias, thermal stability, heat sinks. **Concept of feedback:** positive negative feedback, feedback topologies: voltage series, current series, voltage shunt, current shunt, effect of feedback on gain bandwidth etc., concept of stability only qualitative treatment.

UNIT-II

Oscillators: Bark hausen criterion, RC oscillators (phase shift, weinbridge), L oscillators (Hartley, colpitts), crystal oscillators (qualitative treatment only), **power**

amplifiers : various classes of operation, efficiency and distortion (qualitative treatment only), **OP AMP:** block diagram, ideal OP AMP, DC and AC characteristics, inverting and non-inverting amplifiers Applications: peak detector, sample and hold circuit and precision rectifiers clipping and clamping circuits, wave generation and basic compensators.

UNIT - III

Combinational circuits: Number systems, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, K-map representation, simplification of logic functions using K-map, minimization of logical functions. Don t care conditions. circuits: Multiplexer, De-Multiplexer, Adders, Subtractors , BCD arithmetic, carry look ahead adder, serial adder, digital comparator, parity checker/generator, code converters, encoders, decoders.

UNIT - IV

Sequential circuits and systems: Introduction , SR latch, the clocked SR flip flop, J, K, T and D-type flip flops, **applications of flip flops:** shift registers, applications of shift registers: serial to parallel converter, parallel to serial converter, ring counter, sequence generator, counters: ripple(Asynchronous) counters, synchronous counters, mod n counters design , applications of counters

UNIT - V

A/D and D/A Converters: Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, example of A/D converter.

Semiconductor memories and Programmable logic devices: Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory (RAM), ROM as a PLD, Programmable logic array, Programmable array logic, introduction to : complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA)

TEXT BOOKS :

1. Jacob Millman, Christos C. Halkias, and Satyabrata Jit, Electronic Devices and Circuits, 3rd ed., McGraw Hill
2. Education, 2010. 2. David A. Bell, Electronic Devices and Circuits, 5th ed., Oxford University Press, 2009. 3. S

3. Salivahanan, N Kumar, and A Vallavaraj, Electronic Devices and Circuits , 2nd ed., McGraw Hill Education, 2007
4. M. M. Mano, Digital logic and Computer design, Pearson Education India, 2016.
5. A. Kumar, Fundamentals of Digital Circuits, Prentice Hall India, 201

REFERENCES/SUGGESTED READING:

1. Jacob Millman, Christos Halkias, Chetan Parikh, Integrated Electronics, 2nd ed., McGraw Hill Education (India) Private Limited, 2011.
2. Donald L Schilling & Charles Belove, Electronics Circuits, Discrete & Integrated , 3rd ed., McGraw Hill Education (India) Private Limited, 2002.
3. R. P. Jain, Modern Digital Electronics, McGraw Hill Education, 2009.

Course Code	Course Title	Core/Elective					
4MC302HS	HUMAN VALUES & PROFESSIONAL ETHICS	Core					
		L	T	P/D	Credits	CIE	SEE
		2	-	-	2	40	60

Prerequisite : Adaptive

COURSE OBJECTIVES :

The objective of this course is to make the student

1. To create an awareness on Human Values and Engineering Ethics.
2. To move from discrimination to commitment.
3. To understand social responsibility of an engineer.
4. To appreciate ethical dilemma while discharging duties in professional life.
5. To encourage students to discover what they consider valuable in life.

COURSE OUTCOMES :

After completion of the course, the student will be able to

1. Understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Assess their own ethical values and the social context of problems
3. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
4. Understand the role of a human being in ensuring harmony in society and nature.
5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

UNIT-I :

Introduction to Value Education

1. Value Education, Definition, Concept and Need for Value Education
2. The Content and Process of Value Education
3. Self-Exploration as a means of Value Education
4. Happiness -Sukh, Suvidha, Sanyam & Swasthya.

UNIT - II:

Harmony in the Human Being

1. Human Being is more than just the Body
2. Harmony of the Self ('I') with the Body
3. Understanding Myself as Co-existence of the Self and the Body
4. Understanding Needs of the Self and the Needs of the Body

UNIT - III :

Harmony in the Family and Society and Harmony in Nature

1. Family as a basic unit of Human Interaction and Values in Relationships
2. The Dynamics of Mutual respect in Today's World – Affection, Care, Guidance, Reverence, Gratitude and Love.
3. Comprehensive Human Goals: The Five dimensions of Human Endeavour – Justice, Trust, Competence, Right Attitude and Mutual Tolerance

UNIT - IV :

Social Ethics

1. The Basics for Ethical Human conduct
2. Challenges to ethical conduct in existence
3. Holistic perception of Harmony in existence
4. Social Hierarchy - Ethical Conduct and Mutual Co-existence

UNIT - V:

Professional Ethics

1. Sanctity of Human values
2. Definitiveness of Ethical Human Conduct
3. Basics for Humanistic Education

TEXT BOOKS :

1. A.N Tripathy, "Human Values", New Age International Publishers, 2003.
2. Bajpai. B. L., Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted, 2004
3. Bertrand Russell Human Society in Ethics & Politics, Taylor and Francis, 2007

REFERENCES/SUGGESTED READING :

1. Corliss Lamont, Philosophy of Humanism, Humanist Press, 1997
2. Gaur. R.R. , Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.
3. Gaur. R.R. , Sangal. R , Bagaria. G.P, Teachers Manual Excel Books, 2009.
4. Mortimer. J. Adler, – Whatman has made of man, Hardcover, 2007.

Course Code	Course Title	Core/Elective					
4ES304HS	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	Core					
		L	T	P/D	Credits	CIE	SEE
		2	-	-	-	40	60

Prerequisite: Adaptability

COURSE OBJECTIVES :

The objective of this course is to make the student

1. To reinforce the students understanding with the pan-Indian heritage in terms of culture, traditions and knowledge.
2. To impart understanding of the importance of the roots of the traditional knowledge and types.
3. To impart basic knowledge on the evolution of the multiple languages that highlight India's diversity.
4. To know Indian Languages, Philosophies, Religion, Literature, Fine arts and Technology.
5. To explore the Ancient Science & Scientists, in Medieval and Modern India; the education system

COURSE OUTCOMES :

After completion of the course, the student will be able to

1. Understand the concepts of Indian culture and Traditions and their importance.
2. Distinguish the Indian languages and literature
3. Learn the philosophy of Ancient, Medieval and Modern India.
4. Acquire the information about the fine arts in India
5. Know the contribution of scientists of different eras; interpret the concepts and the importance to protect Intellectual property of the nation.

UNIT-I

Introduction to Culture: Civilization, Culture and Heritage .General characteristics of culture, importance of culture in human literature. Indian Culture, Ancient India, Medieval India, Modern India.

UNIT - II

Indian Languages, Culture and Literature:

Indian Languages and Literature-I: the evolution and role of Sanskrit, Prakrit, significance of scriptures to current society Indian philosophies, other Sanskrit literature, literature of south India (Tamil).

Indian Languages and Literature-II: Northern Indian languages & literature

UNIT - III

Religion and Philosophy: Religion and Philosophy in Ancient India (Buddhism, Jainism and Shatdarshanas).

Religion and Philosophy in Medieval India. Religious reform movements in Modern India (Brahma Samaj & Arya Samaj).

UNIT - IV

Fine Arts in India (Art, Technology& Engineering):

Indian Painting, Indian handicrafts Music: Divisions of Indian classical music, modern Indian music Dance and Drama

Indian Architecture - Ancient (Harrappa and Mohenjodaro, Buddhist sculpture, Ashokan rock cut pillars, Iron Pillar of Mehrauli); Medieval- Bruhadeshwara temple, Ramappa Temple, Vijayanagara, Hampi) and Modern Architecture

Science and Technology in India :

Development of science in Ancient, Medieval and Modern India. Their relation in terms of modern scientific perspective.

Science and Scientists of Ancient, Medieval and Modern India , Protection of traditional knowledge, significance, value to economy: role of government in protection of indigenous knowledge and technology; protection of traditional knowledge bill, 2016.

UNIT - V

Education System in India :

Education in Ancient, Medieval and Modern India , Aims of education- Universities in Ancient India, Women Education in Ancient, Medieval and Modern India, National Education Policy - 2020.

TEXT BOOKS :

1. Indian Knowledge Systems (2 Vols-Set),Kapil Kapoor and Avadhesh Kumar Singh, ISBN 10: 8124603367 / ISBN 13: 9788124603369, Published by D K Print world, Publication Date : 2007.

2. Basanta Kumar Mohanta and Vipin K. Singh, Traditional Knowledge System and Technology in India, Book Originally published: 2012 Publication Date: 2012; ISBN 10: 8177023101ISBN 13: 9788177023107.
3. Nitin Singhania,Indian Art and Culture, 4th Edition, ISBN: 9354601804 • 9789354601804, © 2022 | Published: December 20, 2021.
4. S. Narain, Education and Examination Systems in Ancient India, written/ authored/edited by S. Narain', published 2017, English- Hardcover, ISBN 9789351282518 publisher: Kalpaz Publications.

REFERENCES/SUGGESTED READING

1. Science in Samskrit, Samskrita Bharati, Published by Samskrita Bharati, New Delhi, India, 2007; ISBN 10: 8187276339 / ISBN 13: 9788187276333.
2. 1.7-Position paper, National Focus Group on Arts, Music, Dance and Theatre NCERT, March 2006, ISBN 81-7450-494-X, NCERT, New Delhi, 2010.
3. Founders of Sciences in Ancient India,Satya Prakash, Vijay Kumar Publisher, New Delhi, 1989.
4. Essentials of Indian Philosophy,M. Hiriyanna, Motilal Banarsidass Publishers, New Delhi, 2005.
5. NCET Books from VI to XII standards.
6. The social and economic conditions of Medieval India. Chopra, Puri & Das.

Course Code	Course Title	Core/Elective					
4PC351EE	ANALOG AND	Core					
	DIGITAL	L	T	P/D	Credits	CIE	SEE
	ELECTRONICS LAB	-	-	2	1	40	60

Prerequisite : Basics of Analog and digital electronics theory

COURSE OBJECTIVES :

The objective of this course is to make the student

1. Designing of wave shaping circuits using diodes
2. Designing of single and multistage amplifier circuits
3. Demonstrate negative feedback in amplifiers circuits and positive feedback in oscillators
4. Explain the principle concepts of Digital Logic Design.
5. Distinguish between the Sequential and Combinational Logic Circuits.
6. Design the Logic Circuit using Combinational and Sequential Circuits.

COURSE OUTCOMES :

After completion of the course, the student will be able to

1. Understand the characteristics of electronics devices.
2. Analyze feedback amplifiers and op amp oscillators.
3. Design single and multi-stage amplifier, wave shaping and controller circuits
4. Understand working of logic gates.
5. Understand Combinational and Sequential logic circuits and its applications using Multisim.
6. Understand the process of Analog to Digital conversion and Digital to Analog conversion. And also Use PLCs to implement the given logical problem.

LIST OF EXPERIMENTS

ANALOG

1. Static characteristics of MOSFET in CS configuration
2. Frequency response of single and two stage BJT amplifier in CE configuration
3. Inverting and non -inverting amplifier using OP AMP

4. RC phase oscillator and Wein Bridge oscillator using OP AMP
5. Clipping and clamping circuits
6. Generation of triangular and square wave using OP AMP
7. Design of lead lag compensator using OP AMP

DIGITAL

1. Realization of different logic gates.
2. Verification of multiplexer operation
3. Half adder, full adder and subtractor and realization of combinational logic
4. Synchronous counters and Asynchronous counters
5. A / D converters and D / A converters
6. Simulation of error detecting codes using VHDL/Verilog/Multisim
7. Simulation of flip/flops using VHDL/Verilog/Multisim
8. Simulation of encoders and decoders using VHDL/Verilog/Multisim
9. Experiment on programmable logic devices (ROM/RAM/PLA/PAL/FPG)

Note : At Least 5 Experiments From Each Section Should Be Performed.

REFERENCES/SUGGESTED READING :

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, Basic Electronics, A text-Lab Manual, 7 thEdition. Mc- Graw- Hill Higher Education 2001.
2. R. P. Jain, Modern Digital Electronics, McGraw Hill Education, 2009.
3. M. M. Mano, Digital logic and Computer Design, Pearson Education India, 2016.

Course Code	Course Title	Core/Elective					
4ES354CS	PROGRAMMING FOR PROBLEM SOLVING LAB	Core					
		L	T	P/D	Credits	CIE	SEE
		-	-	2	1	40	60

Prerequisites: Mathematical Knowledge, Logical and Analytical Thinking

COURSE OBJECTIVES :

The objective of this course is to make the student

1. Understand the fundamentals of programming in C Language.
2. Write, compile and debug programs in C.
3. Formulate solution to problems and implement in C.
4. Effectively choose programming components to solve computing problems

COURSE OUTCOMES :

After completion of the course, the student will be able to

1. Choose appropriate data type for implementing programs in C language
2. Design and implement modular programs involving input output operations, decision making and loopingconstructs
3. Apply derived data types and implement programs to store data in structures and files
4. Develop confidence for self-education and ability towards lifelong learning need of computer languages

LIST OF EXPERIMENTS

1. Finding maximum and minimum of given set of numbers, finding roots of quadratic equation.
2. Sin x and Cos x values using series expansion.
3. Generating Pascal triangle, pyramid of numbers.
4. Factorial, Fibonacci, GCD recursive and non-recursive procedures
5. Linear search and binary search using recursive and non-recursive procedures.
6. Bubble sort and selection sort.
7. Matrix addition and multiplication using arrays,
8. Programs on pointers: pointer to arrays, pointer to functions.
9. Programs on structures, union, enum and string manipulations.
10. File handling programs (Reading, Writing, Copyingfiles) 11.Program illustrating using Command Line Arguments

Note : A minimum of Ten experiments to be performed.