**B.E. (ECE) - IV SEMESTER**

| S. No. | Course Code | Course Title | Scheme of Instruction | | | | Scheme of Examination | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | Total Hours | CIE | SEE | |
| **Theory** | | | | | | | | | |
| 1 | 5PC405EC | Analog Electronic Circuits | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 2 | 5PC406EC | Automatic Control Systems | 3 | 1 | 0 | 3 | 40 | 60 | 4 |
| 3 | 5PC407EC | Computer Organization and Architecture | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 4 | 5PC408EC | Electro Magnetic Theory and Transmission Lines | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 5 | 5PC409EC | IC Applications | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 6 | 5MC402HS | Essence of Indian Traditional Knowledge | 2 | 0 | 0 | 2 | 40 | 60 | 0 |
| 7 | 5HS403HS | Human Values and Professional Ethics | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| **Laboratories** | | | | | | | | | |
| 8 | 5PC453EC | AEC Laboratory | 0 | 0 | 2 | 2 | 40 | 60 | 1 |
| 9 | 5PC454EC | IC Applications Laboratory | 0 | 0 | 2 | 2 | 40 | 60 | 1 |
| **Total Credits** | | | | | | | | | **21** |

# IV - Semester Detailed Syllabus

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5PC405EC | Analog Electronic Circuits | | | | | | Core |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| - | 3 | 0 | - | 0 | 40 | 60 | 3 |

**COURSE OBJECTIVES :**

1. The Understand the applications of BJT & FET as a switch and as an amplifier.
2. Analysis of BJT & FET in various configurations using small signal equivalent models and their frequency response.
3. Familiarize with concept and effect of negative feedback.
4. Study of positive feedback and Design different types of oscillators.
5. Design Power Amplifiers and calculate their efficiencies.

**COURSE OUTCOMES :**

1. Recall and relate the knowledge of BJT and FET behavior in the design of various biasing and amplifier circuits.
2. Apply low and high frequency models of transistor in the analysis of single stage and multistage amplifiers.
3. Design and analyze amplifier and oscillator circuits.
4. Compare and Contrast different types of biasing, Multistage, Feedback and Power amplifiers.
5. Interpret a given analog circuit and evaluate its performance parameters by applying acquired knowledge.

**UNIT-I**

**Transistor at high frequencies :** Hybrid $\pi$ CE transistor model, Hybrid p Conductance's and Capacitances, CE short circuit current gain, Current gain with resistive load, Miller's Theorem.

**BJT Amplifiers - Frequency Response:** Frequency response of BJT Amplifier, Analysis at Low and High frequencies, Effect of coupling and bypass Capacitors - Single Stage CE Transistor Amplifier Response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

**UNIT - II**

**Multi Stage Amplifiers-**Analysis of Cascaded RC Coupled BJT amplifiers, Cascode Amplifier, Darlington Pair, Different Coupling Schemes used in Amplifiers - RC Coupled Amplifier, Transformer Coupled Amplifier, Direct Coupled Amplifier.

**UNIT - III**

**Feed Back Amplifiers:** The feedback concept, General characteristics of negative feedback amplifier, Effect of negative feedback on input and output impedances. Method of analysis of feedback amplifiers, Analysis of Voltage series, voltage shunt, current series and current shunt feedback amplifiers.

**UNIT - IV**

**Oscillators:** Positive feedback and conditions for sinusoidal oscillations, RC oscillator, LC oscillator, Crystal oscillator, Amplitude and frequency stability of oscillator.

**Voltage Regulators:** Transistor series and shunt voltage regulators.

**UNIT - V**

**Large Signal Amplifies:** Large Signal Amplifiers: BJT as large signal audio amplifiers, Classes of operation, Harmonic distortion, Class A resistive coupled and transformer coupled amplifiers, Class-B Push-pull and complementary symmetry amplifiers, Class AB operation.

**TEXT BOOKS :**


1. Millman and Halkias, -"Electronic Devices and Circuits", 2nd Edition, McGraw Hill Publication, 2007.
2. Robert L. Boylestad, -"Electronic Devices and Circuit Theory", 10th Edition, PHI, 2009.


**REFERENCE BOOKS :**


1. Jacob Millman, Christos Halkias, Chetan Parikh, -"Integrated Electronics", 2nd Edition, McGraw Hill Publication, 2009.
2. David Bell, -"Fundamentals of Electronic Devices and Circuits", 5th Edition, Oxford University Press, 2008.
3. Christian Piguet, -"Low Power CMOS Circuits Technology, Logic Design and CAD Tools" 1st Indian Reprint, CRC Press, 2010.
4. S.K. Gandhi, - "VLSI Fabrication Principles: Silicon and Gallium Arsenide", Wiley India Pvt. Ltd., New Delhi, 2nd Edition. 1994.

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5PC406EC | Automatic Control Systems | | | | | | Core |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| - | 3 | 1 | - | 0 | 40 | 60 | 4 |

**COURSE OBJECTIVES :**

1. To Analyze the stability and performance of dynamic systems in both time and frequency domain.
2. To design feedback controllers, such as PID, lead and lag compensators, to meet desired system performance specifications.
3. To provide knowledge of state variable models and fundamental notions of state model design.
4. To understand the classical methods of control engineering and physical system modeling by linear differential equations.
5. To understand state space representation of control systems.

**COURSE OUTCOMES :**

1. Convert a given control system into equivalent block diagram and transfer function.
2. Analyze system stability using time domain techniques.
3. Analyze system stability using frequency domain techniques.
4. Design a digital control system in the discrete time domain.
5. Analyze a control system in the state space representation.

**UNIT - I**

**Control System Fundamentals and Components:** Classification of control systems including Open and Closed loop systems, Transfer function representation, Mathematical modeling of Mechanical systems and their conversion into electrical systems, Block diagram representation, Block diagram algebra and reduction and Signal flow graphs and Mason's gain formula.

**UNIT - II**

**Time Response:** Transfer function and types of input. Transient response of second order system for step input. Time domain specifications Characteristic Equation of Feedback control systems Types of systems, static error coefficients, error series.

**Stability:** Concept of Stability, Routh-Hurwitz criterion for stability, Root locus technique and its construction.

**UNIT - III**

**Frequency Response Plots:** Bode plots, frequency domain specifications Gain and Phase margin. Principle of argument Nyquist plot and Nyquist criterion for stability

**Compensation Techniques:** Cascade and feedback compensation. Phase lag, lead and lag-lead compensators PID controller.

**UNIT - IV**

**State Space Representation:** Concept of state and state variables. State models of linear time invariant systems, State transition matrix, Solution of state equations. Controllability and Observability

**UNIT - V**

**Discrete Control Systems :** Digital control, advantages and disadvantages, Digital control system architecture. The discrete transfer function sampled data system Transfer function of sample data systems. Analysis of Discrete data systems

**TEXT BOOKS :**


1. Nagrath, I.J, and Gopal. M, "Control System Engineering", 5th Edition, New Age Publishers, 2009.
2. Nagoor Kani. "Control systems", Second Edition, RBA Publications,


**REFERENCE BOOKS :**


1. Ogata, K., “Modern Control Engineering”, 5th Edition, PHI.
2. Ramesh Babu, “Digital Signal Processing”, 2nd Edition.
3. K. Deergha Rao, Swamy MNS, “Digital Signal Processing, Theory and Applications”, 1st Edition, Springer Publications, 2018.

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5PC407EC | Computer Organization and Architecture | | | | | | Core |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| - | 3 | 0 | - | 0 | 40 | 60 | 3 |

**COURSE OBJECTIVES :**

1. Implement the Fixed point and Floating point addition, Subtraction, multiplication and Division.
2. Describe the basic structure and operation of a Digital computer.
3. Discuss the different ways of communicating with I/O devices and standard I/O interfaces.
4. Analyze the hierarchical memory system including cache memories and virtual memory.
5. Understand issues affecting modern processors.

**COURSE OUTCOMES :**

1. Apply digital engineering fundamentals to acquire knowledge of arithmetic algorithms for different processors.
2. Interpret the concept of Basic processor system and analyze the performance of Micro programmed Control unit organization.
3. Implementing the techniques of pipelining and parallelism to analyze the performance of a Processor.
4. Apply the conceptual knowledge of system development with appropriate I/O Interface.
5. Interpret various techniques for efficient memory utilization to develop a system application.

**UNIT - I :**

**DATA REPRESENTATION AND COMPUTER ARITHMETIC :**

Introduction to Computer Organization and architecture, evolution and computer generations; Fixed point representation of numbers, digital arithmetic algorithms for Addition, Subtraction, ripple carry adder, carry look-ahead adder, Multiplication using Booth's algorithm and Division using restoring and non restoring algorithms. Floating point representation with IEEE standards and its arithmetic operations.

**UNIT - II**

**BASIC PROCESSOR ORGANIZATION AND DESIGN :**

Instruction codes, stored program organization, computer registers and common bus system, computer instructions, timing and control, instruction cycle: Fetch and Decode, Register reference instructions; Memory reference instructions. Input, output and Interrupt: configuration, instructions, Program interrupt, Interrupt cycle, Micro programmed Control organization, address sequencing, micro instruction format and micro program sequencer.

**UNIT - III**

**CENTRAL PROCESSING UNIT:**

General register organization, stack organization, instruction formats, addressing modes, Data transfer and manipulation, Program control. CISC and RISC: features and comparison. Pipeline and vector Processing, Parallel Processing, Pipelining, Instruction Pipeline, Basics of vector processing and Array Processors.

**UNIT - IV**

**INPUT - OUTPUT ORGANIZATION :**

I/O Bus and interface modules, I/O versus Memory Bus, Asynchronous data transfer: Strobe control, Handshaking, Asynchronous serial transfer. Modes of Transfer: Programmed I/O, Interrupt driven I/O, Priority interrupt; Daisy chaining, Parallel Priority interrupt. Direct memory Access, DMA controller and transfer. Input output Processor, CPU-IOP communication.

**UNIT - V**

**MEMORY ORGANIZATION:**

Memory hierarchy, Mapping of memory with CPU, Primary memory, Concept of memory interleaving, Associative memory, Cache memory organization and performance measures, cache mapping functions, Virtual memory organization, paging mechanism, address mapping using pages, Memory management hardware

**TEXT BOOKS :**


1. Morris Mano, M., "Computer System Architecture," 3/e, Pearson Education, 2005.
2. Hamacher, Vranesic, Zaky, "Computer Organization," 5/e, McGraw Hill, 2007.


**REFERENCE BOOKS :**


1. William Stallings, "Computer Organization and Architecture: Designing for performance," 7/e, Pearson Education, 2006.
2. Govindarajulu, B., “Computer Architecture and Organization” , 2/e, TMH, 2010.
3. John Hennessy and David Patterson, "Computer Architecture: A Quantitative Approach", 5th Edition, Elsevier.

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5PC408EC | Electro Magnetic Theory and Transmission Lines | | | | | | Core |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| - | 3 | 0 | - | 0 | 40 | 60 | 3 |

**COURSE OBJECTIVES :**

1. Analyze fundamental concepts of vector analysis, electrostatics and magneto statics law and their applications to describe the relationship between Electromagnetic Theory and circuit theory.
2. Formulate the basic laws of static electricity, magnetism and extend them to time varying fields to define the Maxwell's equations in differential and integral form.
3. Derive the wave equations for conducting and di-electric mediums to analyze the wave propagation characteristics of Uniform Plane Waves (UPW) in normal and oblique incidences.
4. Analyze fundamental concepts of Transmission lines and to formulate the basic relationship between distortion less transmission lines & applications.
5. To understand the concepts of RF Lines and their characteristics, Smith Chart, and its applications, acquires knowledge to configure circuit elements, QWTs and HWTs and to apply the same for practical problems.

**COURSE OUTCOMES :**

1. Understand the different coordinate systems, vector calculus, coulombs law and gauss law for finding electric fields due to different charges and to formulate the capacitance for different capacitors.
2. Learn basic magneto-statics concepts and laws such as Biot –Savart's law and Amperes law, their application in finding magnetic field intensity, inductance, and magnetic boundary conditions.
3. Distinguish between the static and time-varying fields, establish thecorresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.

4. Determine the Transmission Line parameters for different lines, characterize the distortions and estimate the characteristics for different lines.
5. Analyze the RF Line features and configure them as SC, OC Lines, $\lambda/2$, $\lambda/4$ and $\lambda/8$ Lines and design the same for effective impedance transformation.
6. Study the Smith Chart profile and stub matching features, and gain ability to practically use the same for solving practical problems.

**UNIT - I**

**Electrostatics:** Review of coordinate systems. Coulomb's Law, Electric field due to various Charge distributions and Electric flux density. Gauss's Law and its applications. Work, Potential and Energy, The dipole. Current and Current density, Laplace and Poisson's equations. Calculation of capacitance for simple configurations.

**UNIT - II**

**Magnetostatics:** Steady magnetic - Biot-Savart's law, Ampere's law. Stoke's theorem, Magnetic flux and magnetic flux density. Scalar and vector magnetic potentials. Electric and Magnetic fields boundary conditions. Maxwell's equations for static and time varying fields.

**UNIT - III**

**Electromagnetic Waves :**

Uniform plane waves in free space and in conducting medium, Polarization. Instantaneous, average and complex Power, Poynting theorem, Surface Impedance.

**Reflection and Refraction:** Normal and Oblique incidence on dielectric and conducting medium.

**UNIT - IV**

**Transmission Lines 1:**

Overview of T and p networks. Two wire Transmission lines, Primary and secondary constants. Transmission Line equations. Infinite line and characteristic impedance-Open and short circuit lines and their significance. Distortion less transmission line, Concept of loading of a transmission line, Campbell's formula.

**UNIT - V**

**Transmission Lines 2 :**

Impedance of a transmission line, RF and UHF lines, transmission lines as circuit elements. Properties of $\lambda/2$, $\lambda/4$ and $\lambda/8$ Lines. Reflection coefficient and VSWR. Matching: Stub matching. Smith chart and its applications.

**TEXT BOOKS :**


1. Matthew N.O. Sadiku, "Principles of Electro-magnetics", Oxford University Press, 6th edition 2016.
2. William H. Hayt Jr. and John A. Buck, -"Engineering Electromagnetics", Tata McGraw Hill, 7th edition, 2006.


REFERENCE BOOKS :


1. E.C. Jordan and K.G. Balmain, "Electromagnetic Waves and Radiating Systems", Pearson, 2nd edition, 2015.
2. K.D. Prasad, "Antennas and Wave Propagation", Khanna Publications.
3. Nannapaneni Narayana Rao, "Elements of Engineering Electromagnetics", Pearson, 6th edition, 2004.

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5PC409EC | IC Applications | | | | | | Core |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| - | 3 | 0 | - | 0 | 40 | 60 | 3 |

**COURSE OBJECTIVES :**

1. To learn the concept of Op-Amp and it's characteristics.
2. To impart the linear and non-linear applications of operational amplifier.
3. To impart the theory and applications of 555 IC Timer, PLL & IC Regulator.
4. To learn the characteristics of different logic families.
5. Discuss the operation of the most commonly used D/A and A/D converters.
6. To analyze combinational and sequential circuits with ICs.

**COURSE OUTCOMES :**

**Student will be able to:**

1. Understand the basic construction, characteristics and parameters of Op-Amp.
2. Analyze the linear and non-linear applications of Op-Amp.
3. Understand the concepts of IC555 timer, IC723 regulator and PLL.
4. Classify and describe the characteristics of different logic families.
5. Design and analyze ADC & DAC converters.
6. Design the Combinational and Sequential circuits with ICs.

**UNIT - I**

**Differential Amplifiers:** Classification, DC and AC analysis of single, dual input Balanced and unbalanced Output Configurations of Differential amplifiers using BJTs, Level Translator.

**Introduction to ICs:** Integrated circuits classification, Integrated circuit package & types, pin identification and temperature ranges.

**Operational Amplifier (IC741):** Op-Amp block diagram, ideal Op-Amp Characteristics, Op-Amp parameters: Input offset voltage; Output offset voltage, input offset and bias currents, Slew rate, CMRR and PSRR.

**UNIT - II**

**Op-Amp Applications :** Inverting and Non-inverting amplifiers with ideal and non-ideal Op-amps, Voltage Follower, Difference Amplifier, Summing Amplifier, ideal and practical Integrator and differentiator, Voltage to Current and Current to Voltage converters, Log and antilog amplifiers, Comparator, Schmitt Trigger with and without reference voltage, Triangular waveform generator.

**Active Filters :** Introduction – First order, Second order Active filters - LP, HP, BP, BR and All pass filter.

**UNIT-III**

**555 Timer:** Functional diagram. Modes of operation: Monostable, Astable multivibrators, applications of 555 Timer.

**Voltage Regulators :** Basic of voltage Regulators, Linear regulators using op-amp, IC Regulators 78XX and 723.

**PLL :** Operation, lock range, Capture range, PLL applications: Frequency multiplier and frequency translator.

**UNIT-IV**

**Logic families:** Digital IC characteristics. TTL logic family, TTL series and TTL output configurations: open collector, Totem pole, Tri state logic. MOS logic family, CMOS logic family and its series characteristics, CMOS transmission gate, CMOS open drain and high impedance outputs. Comparison of TTL and CMOS logic families

**Data Converters :** Introduction, Digital to Analog Converters: Weighted Resistor DAC & Inverted R-2R Ladder DAC. Analog to digital Converters: Parallel Comparator ADC, Successive Approximation ADC and Dual Slope ADC. DAC and ADC specifications.

**UNIT-V**

**Combinational Circuits:** Design using TTL-74XX or CMOS 40XX series: Decoders, drivers for LED, Encoder, priority encoder, Multiplexer and their applications, Demultiplexer, Digital comparator, Parallel and serial binary adder, Subtractor circuits using 2's complement. Carry look-ahead adder, BCD adder.

**Sequential Circuits:** Design using TTL-74XX or CMOS 40XX series: Synchronous and Asynchronous counters, Cascading of BCD counters, applications of counters, Shift register and applications.

**TEXT BOOKS:**


1. David A Bell, -"Operational Amplifiers and Linear ICs", 3/e, Oxford Publications, 2011.
2. Ramakant A. Gayakwad, "Op-Amps and Linear Integrated Circuits," 4/e, PHI, 2010.


**REFERENCE BOOKS:**


1. D.Roy Chowdhury, Shail B. Jain, "Linear Integrated Circuits", 4/e, New / Age International (P) Ltd., 2008.
2. Ronald J. Tocci, Neal S. Widmer & Gregory L.Moss, "Digital Systems: Principles and Applications", 10/e, PHI, 2011.
3. Jain R.P, "Modern Digital Electornics", 4/e, TMH, 2011.

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5MC402HS | Essence of Indian Traditional Knowledge | | | | | | MC |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| - | 2 | 0 | - | 0 | 40 | 60 | 0 |

**COURSE OBJECTIVES :**

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 :**

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**

- Dawn of human civilization and evolution of various cultures.
- 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, significance of scriptures to current society.
- Indian philosophies, other Sanskrit literature, literature of south India.
- Indian Languages and Literature - II :
- Northern Indian languages & literature.

**UNIT - III**

- Religion and Philosophy.
- Religion and Philosophy in ancient India.
- Religion and Philosophy in medieval India.
- Religious reform movements in modern India (selected movements only).

**UNIT - IV**

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

- Indian Painting, Indian handicrafts.
- Music: Divisions of Indian classic music, moderm Indian music.
- Dance and Drama-Indian Architecture (ancient, medieval and modern) Science and Technology in India.
- development of science in ancient, medieval and modern India. Their relation in terms of modern scientific perspective.
- 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, subjects, languages.
- Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India.

**TEXT BOOKS :**


1. Kapil Kapoor and Avadhesh Kumar Singh, "Indian Knowledge Systems" (2 Vols-Set), ISBN 10: 8124603367 / ISBN 13: 9788124603369, Published by D K Print world, Publication Date: 2007.
2. Samskrita Bharati, "Science in Samskrit, Samskrita Bharati", Published, New Delhi, India, 2007; ISBN 10: 8187276339 / ISBN 13: 9788187276333.
3. 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.


**REFERENCE BOOKS :**


1. 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.
2. Nitin Singhania, "Indian Art and Culture", 4th Edition, ISBN: 9354601804 • 9789354601804, © 2022 | Published: December 20, 2021.
3. S. Narain, "Education and Examination Systems in Ancient India", written/ authored/edited, published 2017, English-Hardcover, ISBN 9789351282518 publisher: Kalpaz Publications.
4. Satya Prakash, "Founders of Sciences in Ancient India", Vijay Kumar Publisher, New Delhi, 1989.
5. M. Hiriyanna, "Essentials of Indian Philosophy", Motilal Banarsidass Publishers, New Delhi, 2005.

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5HS403HS | Human Values and Professional Ethics | | | | | | Core |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| Adaptive | 3 | 0 | - | 0 | 40 | 60 | 3 |

**COURSE OBJECTIVES :**

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 :**

1. Understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature.
4. 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:** Value Education, Definition, Concept and Need for Value Education. The Content and Process of Value Education. Basic Guidelines for Value Education. Self-exploration as a means of Value Education. Happiness and Prosperity as parts of Value Education.

**UNIT - II**

**Harmony in the Human Being:** Human Being is more than just the Body. Harmony of the Self ('I') with the Body. Understanding Myself as Co-existence of the Self and the Body. Understanding Needs of the Self and the needs of the Body. Understanding the activities in the Self and the activities in the Body.

**UNIT - III**

**Harmony in the Family and Society and Harmony in the Nature**

Family as a basic unit of Human Interaction and Values in Relationships. The Basics for Respect and today's Crisis: Affection, Guidance, Reverence, Glory, Gratitude and Love. Comprehensive Human Goal: The Five Dimensions of Human Endeavour. Harmony in Nature : The Four Orders in Nature. The Holistic Perception of Harmony in Existence.

**UNIT - IV**

**Social Ethics :** The Basics for Ethical Human Conduct. Defects in Ethical Human Conduct. Holistic Alternative and Universal Order. Universal Human Order and Ethical Conduct. Human Rights violation and Social Disparities.

**UNIT - V**

**Professional Ethics :** Value based Life and Profession. Professional Ethics and Right Understanding. Competence in Professional Ethics. Issues in Professional Ethics – The Current Scenario. Vision for Holistic Technologies, Production System and Management Models.

**TEXT BOOKS :**


1. R. R. Gaur, R Sangal, G P Bagaria, -A Foundation Course in Human Values and Professional Ethics, 2009.
2. Prof. K. V. Subba Raju, -Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition, 2013, Ivan IIIich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA.


**REFERENCE BOOKS :**


1. E. F. Schumancher, 1973, "Small is Beautiful: a study of economics as if people mattered". Blond & Briggs, Britain.
2. A Nagraj, 1998, "Jeevan Vidya ek Parichay", Divya Path Sansthan, Amarkantak. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986.
3. Smriti Shristava, "Human Values and Professional Ethics", Katson Publications, 2007
4. Bertrand Russell, "Human Society in Ethics & Politics".
5. Corliss Lamont, "Philosophy of Humanism".

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5PC453EC | AEC Laboratory | | | | | | Core |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| - | 2 | 0 | - | 0 | 40 | 60 | 1 |

**COURSE OBJECTIVES :**

1. To design and simulate various BJT and FET Voltage and Power amplifiers.
2. To design and simulate various BJT Feedback amplifiers.
3. Analyse Oscillator circuits.
4. Analyse Series and Shunt Voltage Regulators.
5. Design and simulate tuned voltage amplifier.

**COURSE OUTCOMES :**

1. Apply the concepts of amplifiers in the design of Public Addressing System.
2. To be able to Generate Sinusoidal wave forms of given specifications.
3. Design stable system using feedback concepts.
4. Design of Tuned amplifier.
5. Design Series and Shunt Voltage Regulators.

**List of Experiments**

1. Two Stage RC Coupled CE BJT amplifier.
2. Two Stage RC Coupled CS FET amplifier.
3. Voltage Series Feedback Amplifier.
4. Voltage Shunt Feedback Amplifier.
5. Current series feedback Amplifier.
6. RC Phase Shift Oscillator.
7. Hartly & Colpitt Oscillators.
8. Design of Class A and Class B Power amplifiers.
9. Constant-k low pass & high pass filters.
10. Series and Shunt Voltage Regulators.
11. RF Tuned Amplifier.

**SPICE :**

12. Two Stage RC Coupled CS FET amplifiers.
13. Voltage Series Feedback Amplifier.
14. Current Shunt Feedback Amplifier.

**Note:** A minimum of 10 experiments should be performed. It is mandatory to simulate any three experiments using SPICE.

| Course Code | Course Title | | | | | | Core/Elective |
|---|---|---|---|---|---|---|---|
| 5PC454EC | IC Applications Laboratory | | | | | | Core |
| Prerequisite | Contact Hours per Week | | | | CIE | SEE | Credits |
| | L | T | D | P | | | |
| - | - | - | - | 2 | 40 | 60 | 1 |

**COURSE OBJECTIVES :**

1. To learn the configurations and parameters of the 741 Op-Amp.
2. To explain the circuits of linear and nonlinear applications of Op-Amp.
3. Design and analyze the active filters circuit using Op-amp.
4. To know the concepts of IC555 timer & IC723.
5. To know the various characteristics of TTL and CMOS gates.
6. To learn combinational and Sequential circuits using digital ICS.

**COURSE OUTCOMES :**

1. Analyze the configurations, parameters of Op-Amp (IC741).
2. Demonstrate the circuits of Op-Amp for various applications.
3. Implement Active filters using Op-amps.
4. Analyze and design the circuits using IC555 timer, IC723 and data converters.
5. Analyze the characteristics of TTL and CMOS gates.
6. Analyze and design various combinational & sequential circuits using digital ICs.

**List of Experiments**

**Part - A : Linear IC**

1. Measurement of Op-Amp parameters.
2. Voltage Follower, Inverting and Non-Inverting Amplifiers using Op-Amp.
3. Arithmetic Circuits using Op-Amp.
4. Active filters : LP, HP and BP using Op-Amp.
5. Triangle and Square wave Generators. Schmitt Trigger using Op-Amp.
6. Monostable and Astable multivibrator using Op-Amp.

7. Astable, Monostable multi vibrators using IC555Timer.
8. IC voltage regulator.
9. Voltage controlled oscillator – NE 565.

**Part - B : Digital IC**

1. Measurement of various characteristic parameters of TTL and CMOS gates.
2. Flip Flop conversions and latches using gates and ICs.
3. Designing Synchronous, Asynchronous up/ down counters.
4. Shift Registers and Ring counters using IC Flip-Flop & Standards IC counters.
5. Interfacing counters with 7-segment LED /LCD display units.
6. Mux – Demux applications.
7. Code Converters and Parity Generator & Checker
8. Binary adder and subtractor, BCD adders using ICs.

**Note:** At least ten experiments should be conducted in the sem, of which three should be from PART - B.

# V & VI - Semester Detailed Syllabus

## B.E V- SEM ECE

| S. No. | Course Code | Course Title | Scheme of Instruction | | | | Scheme of Examination | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | Total Hours | CIE | SEE | |
| | | | | | | | | | |
| 1 | 5PC510EC | Microcontrollers | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 2 | 5PC511EC | Digital Signal Processing | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 3 | 5PC512EC | Analog Communication | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 4 | 5PE51XEC | Professional Elective - I | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 5 | XOE5XXXX | Open Elective – I | 3 | 0 | 0 | 3 | 40 | 60 | 3 |
| 6 | 5HS352HS | Effective Technical Communication | 2 | 0 | 0 | 2 | 40 | 60 | 2 |
| | | | | | | | | | |
| 7 | 5PC551EC | Microcontrollers Lab | 0 | 0 | 2 | 2 | 40 | 60 | 1 |
| 8 | 5PC552EC | Signals and Systems Lab | 0 | 0 | 2 | 2 | 40 | 60 | 1 |
| 9 | 5PW571EC | Mini Project | 0 | 0 | 2 | 2 | 40 | 60 | 1 |
| | | **Total Credits** | | | | | | | **20** |

| 5PE51XEC | Professional Elective-I |
|---|---|
| 1 | Electronics Measurement and Instrumentation |
| 2 | Scripting Languages |
| 3 | Real Time Operating Systems |
| 4 | Neural Networks |

| XOE5XXXX | Open Elective - I | Offered by |
|---|---|---|
| 1 | Disaster Mitigation | CIVIL |
| 2 | Oops using JAVA | CSE |
| 3 | Artificial Intelligence | AI&DS |
| 4 | Renewable Energy Systems | EEE |
| 5 | Basics of Electronic Communication | ECE |
| 6 | Start up & Entrepreneurship | MECH |