

FACULTY OF ENGINEERING
Scheme of Instruction & Examination
(AICTE Model Curriculum)

and

Syllabi

B.E. V and VI Semesters

of

Four Year Degree Programme

in

ELECTRONICS & COMMUNICATION ENGINEERING

(With effect from the Academic Year 2022 - 2023)

(As approved in the Faculty Meeting held on 19-05-2022)



Issued by

Dean, Faculty of Engineering
Osmania University, Hyderabad – 500 007
19.05.2022

SCHEME OF INSTRUCTION & EXAMINATION
B.E.V-Semester
(ELECTRONICS AND COMMUNICATION ENGINEERING)

S.No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Course										
1	PC408EC	Digital Signal Processing	3	-	-	3	30	70	3	3
2	PC409EC	Microprocessor and Microcontroller	3	-	-	3	30	70	3	3
3	PC410EC	Analog Communication	3	-	-	3	30	70	3	3
4	PC411EC	Automatic Control Systems	3	-	-	3	30	70	3	3
5	PC412EC	Antennas and wave Propagation	3	-	-	3	30	70	3	3
6	HS104ME	Industrial Administration and Financial Management	3	-	-	3	30	70	3	3
Practical/Laboratory Course										
7	PC455EC	Microprocessor and Microcontroller Lab	-	-	2	2	25	50	3	1
8	PC456EC	Systems and Signal Processing Lab	-	-	2	2	25	50	3	1
9	PW701EC	Mini Project	-	-	2	2	50	-	-	2
Total			18	-	6	24	280	520	24	22

PC: Professional Core

HS: Humanities and Social Sciences PW: Project Work

L: Lecture

T: Tutorial

P: Practical

D: Drawing

CIE: Continuous Internal Evaluation

SEE: Semester End Examination (Univ. Exam)

EC: Electronics and Communication Engineering ME: Mechanical Engineering

NOTE:

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

DIGITAL SIGNAL PROCESSING

PC408EC

Instruction: 3 periods per week

CIE: 30 marks

Credits: 3

Prerequisites: Signals and Systems (EC305EC)

Duration of SEE: 3 hours

SEE: 70 marks

Course Objectives:

1. To describe the necessity and efficiency of digital signal processing.
2. To discuss various design methods of FIR & IIR filters.
3. To describe the concepts of multirate signal processing and identify important features of TMS320C67XX DSP processors.

Course Outcomes: On successful completion of the course, the students will be able to

1. apply the knowledge of FFT Algorithms for computation of DFT.
2. design of FIR filters using various methods.
3. design of IIR filters using various methods.
4. apply decimation and interpolation concepts for the design of sampling rate converters
5. understand TMS320C67XX DSP processors for the design of digital filters.

UNIT- I
Discrete Fourier Transform and Fast Fourier Transform: Discrete Fourier Transform (DFT), Computation of DFT-Linear and Circular Convolution, FFT algorithms: Radix-2 case, Decimation in Time and Decimation in Frequency algorithms, in place computation, bit Reversal.
UNIT- II
Finite Impulse-Response Filters(FIR): Linear phase filters, Windowing techniques for design of Linear phase FIR filters-Rectangular, triangular, Bartlett, Hamming, Hanning, Kaiser windows, Realization of filters, Finite word length effects.
UNIT- III
Infinite Impulse-Response Filters(IIR): Introduction to filters, comparison between practical and theoretical filters, Butterworth and Chebyshev approximation, IIR digital filter design Techniques, Impulse Invariant technique, Bilinear transformation technique, Digital Butterworth & Chebyshev filters, Implementation, Digital filters structures, Comparison between FIR and IIR.
UNIT- IV
Multirate Digital Signal Processing: Introduction, Decimation by factor D and interpolation by a factor I, Sampling Rate conversion by a Rational factor I/D. Implementation of Sampling Rate Conversion: Multistage implementation of sampling rate conversion, Sampling conversion by an arbitrary factor, Application of Multirate Signal Processing.
UNIT- V
Introduction to DSP Processors: Difference between DSP and other microprocessors architectures Importance of DSP Processors- General purpose DSP processors TMS320C67XX processor, architecture, registers, pipelining, addressing modes and introduction to instruction set.

Suggested Reading:

1	Alan V. Oppenheim & Ronald W. Schaffer, "Digital Signal Processing," PHI, 2 nd edition, 2014.
2	John G. Proakis & Dimitris G. Manolakis, "Digital Signal Processing Principles, Algorithms and Application," PHI, 4 th edition, 2012.
3	Ashok Ambardar, "Digital Signal Processing: A Modern Introduction," Cengage Learning, 2009.
4	Li Tan, "Digital Signal Processing: Fundamentals and Applications," Elsevier, 2012.
5	B.Venkataramani & M. Bhaskar, "Digital Signal Processor Architecture, Programming and Application," TMH, 2e 2013.

MICROPROCESSOR AND MICROCONTROLLER

PC409EC

Instruction: 3 periods per week

CIE: 30 mark

Credits: 3

Duration of SEE: 3 hours

SEE: 70 marks

Prerequisites: Computer Organization and Architecture (PC404EC)

Course Objectives:

1. To understand architecture and programming of 8086 microprocessor and 8051 microcontroller.
2. To describe interfacing of memory, 8255 PPI, and 8251 USART to 8086 processor and differentiation of 8086 and 8051 in terms of internal architecture, memory and programming.
3. To describe interfacing and programming of I/O ports, Timers and UART using 8051 controller and develop interfacing of real time devices like ADC, DAC and stepper motor with 8051.

Course Outcomes: On successful completion of the course, the students will be able to

1. explain the architecture of 8086 microprocessor and recognize different types of addressing modes.
2. write assembly language programming using 8086 microprocessor instruction set.
3. interface different peripherals to 8086 microprocessor.
4. explain the architecture of 8051 microcontroller and write assembly/C language programming using 8051 microcontroller.
5. interface different peripheral modules to 8051 microcontroller.

UNIT-I
8086 Microprocessor: Intel 8086/8088 architecture, Segmented memory, Minimum and Maximum modes of operation, Timing diagram, addressing modes, Instruction set, assembly language programming using data transfer, arithmetic, logical and branching instructions.
UNIT-II
8086 Programming and Interfacing: Assembler directives, macros, procedures, assembly language programming using string manipulation instructions, 8086 Interrupt structure, I/O and memory interfacing concepts using 8086, IC Chip Peripherals-8255 PPI, 8251 USART and their interfacing with 8086.
UNIT-III
8051 Microcontroller: Internal architecture and pin configuration, 8051 addressing modes, instruction set, bit addressable features. I/O port structures, assembly language programming using data transfer, arithmetic, logical and branch instructions.
UNIT-IV
8051 Timers, Serial Port and Interrupts: 8051 Timers/Counters and its programming, Serial data communication, Serial port and its programming, 8051 interrupts, Interrupt vector table, Interrupts programming.
UNIT-V
8051 Interfacing: Interfacing of 8051 with LCD, ADC, DAC, external memory, stepper motor interfacing.

Suggested Reading:

1.	Ray A. K and Bhurchandi K. M, "Advanced Microprocessors and Peripherals", 3/e, Tata McGraw Hill Education Pvt Ltd, 2013.
2.	Mazidi M. A, Mazidi J. G and Rolin D. Mckinlay, "The 8051 Microcontroller & Embedded Systems Using Assembly and C", 2/e, Pearson Education, 2008.
3.	Douglas V. Hall, "Microprocessors and Interfacing Programming and Hardware", 2 nd Edition, Tata McGraw-Hill publishing company Limited, New Delhi, 2008.
4.	Ayala K. J, "The 8051 Microcontroller Architecture, programming & Applications", Penram International, 2007.
5.	Scott Mackenzie and Raphael C. W. Phan. "The 8051 Microcontroller", 4 th Edition, Pearson education, 2008.

ANALOG COMMUNICATION

PC410EC

Instruction: 3 periods per week

CIE: 30 marks

Credits: 3

Prerequisites: Signals & Systems (ES305EC)

Probability Theory and Stochastic Processes (ES304EC)

Duration of SEE: 3 hours

SEE: 70 marks

Course Objectives:

1. To understand the concept of modulation.
2. To describe the generation and detection of various analog and pulse modulation techniques.
3. To describe the structures of AM, FM transmitters and Receivers and analyze the noise performance of analog modulation techniques.

Course Outcomes: On successful completion of the course, the students will be able to

1. understand the need for modulation, transmitter and receiver structures.
2. understand the generation, detection of Amplitude and Angle modulation schemes.
3. compute and compare power and bandwidth requirements of AM, DSB-SC, SSB and FM techniques.
4. understand and compare pulse analog and digital modulation techniques.
5. identify the sources of noise and evaluate the performance of analog communication systems over a noisy channel.

UNIT- I

Introduction: Introduction to communication system, Communication channels, Need for modulation.

Amplitude Modulation: Definition, Time and Frequency domain description – AM, DSB-SC, Single tone modulation, Power relations in AM, Generation of AM signal– Square-law, Switching modulators, AM demodulation- envelop Detector, Generation of DSB-SC Signal – Balanced, Ring modulators, DSB-SC demodulation – Coherent Detector, COSTAS loop.

SSB Modulation: Definition, Time and Frequency domain description, Generation of SSB Signal – Frequency discrimination and phase discrimination methods, Demodulation of SSB – Coherent Detection, Frequency Division Multiplexing, Vestigial Sideband Modulation – Time and Frequency domain description, Generation of VSB signal, Envelop detection of VSB plus carrier, Comparison of all AM techniques, Applications of different AM systems, AM Transmitter, AM super heterodyne receiver, Receiver characteristics.

UNIT- II

Angle Modulation: Definition, basic concepts, Frequency modulation: Single tone FM, Spectrum analysis of sinusoidal FM wave, Narrow band FM, Wide band FM. Constant average power, Transmission bandwidth of FM wave. Generation of FM - Direct and Indirect (Armstrong's) methods. Detection of FM - Balanced frequency discriminator, Phase Locked Loop. Comparison of FM and AM. FM Transmitter, FM Super heterodyne receiver

UNIT-III

<p>Pulse Analog Modulation schemes: Review of sampling theorem, types of sampling. Types of Pulse Analog and Digital Modulation Schemes, Generation and demodulation of Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM). Time Division Multiplexing.</p>
<p>UNIT– IV</p>
<p>Pulse Digital Modulation Schemes: Quantization, Analog to Digital Conversion, PCM, Companding in PCM – μ law, A law. DPCM, DM and ADM. Comparison of PCM, DPCM, DM and ADM. SNR_Q of PCM and DM.</p>
<p>UNIT– V</p>
<p>Noise: Definition, Sources of noise, Atmospheric noise, thermal noise, shot noise, Noise in two-port network: noise figure, equivalent noise temperature of Single and cascade stages, noise equivalent bandwidth. Narrow band noise representation</p> <p>Noise in Analog Communication Systems: Signal to Noise Ratio (SNR) and Figure of merit calculations in AM, DSB-SC, SSB and FM systems, Pre-Emphasis and De-Emphasis.</p>

Suggested Reading:

1	Simon Haykin, “Communication Systems,” 2 nd edition, Wiley India, 2011.
2	H. Taub, D.L. Schilling, “Principles of communication systems”, Tata McGraw Hill, 2001.
3	B.P. Lathi, Zhi Ding, “Modern Digital and Analog Communication Systems”, 4 th edition, Oxford University Press, 2016.
4	Leon W Couch II., “Digital and Analog Communication Systems”, 6 th edition, Pearson Education Inc., 2001.
5	P. Ramakrishna Rao, “Analog Communication,” 1 st edition, TMH, 2011.

AUTOMATIC CONTROL SYSTEMS

PC411EC

Instruction: 3 periods per week

Duration of SEE: 3 hours

CIE: 30 marks

SEE: 70 marks

Credits: 3

Prerequisites: Signals & Systems (EC305EC)

Course Objectives:

1. To analyze the stability and performance of dynamic systems in both time and frequency domain.
2. To understand the impact of various compensators and controllers on system performance.
3. To provide the knowledge of state variable models and digital control systems.

Course Outcomes: On successful completion of the course, the students will be able to

1. develop the mathematical model of the physical systems and find the transfer function using different approaches.
2. analyze system stability using time domain techniques.
3. analyze system stability using frequency domain techniques.
4. verify the stability of digital control systems.
5. illustrate the control systems via state space models.

UNIT – I

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

UNIT – II

Time Response Analysis: Transfer function and types of input. Transient response of first and second order system for step input. Time domain specifications, Characteristic equation of Feedback control 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 Analysis: Introduction to Frequency response of the system. Frequency domain Specifications, Bode plots, Stability analysis, Nyquist plot and Nyquist criterion for stability

Compensation Techniques: Types of Compensation. Phase Lag, Lead and Lag-Lead compensators. Types of controllers proportional (P), integral (I), derivative (D), PID controller

UNIT – IV

Digital Control Systems: Digital control, advantages and disadvantages, Digital control system architecture. Sample and Hold Circuit. Transfer function of sample data systems. Stability analysis by Jury's test.

UNIT – V

State Space Representation: Concept of state and state variables. State models of linear time invariant systems, Derivation of Transfer Function from State Model, State transition matrix,

Solution of state equations. Controllability and Observability.

Suggested Reading:

1	Nagrath, I.J, and Gopal, M., “Control System Engineering”, 5 th edition, New Age Publishers, 2009
2	NagoorKani, “Control systems Engineering”, Oxford & IBH Publishing Company Private Limited, 2021.
3	Ogata, K., “Modern Control Engineering”, 5 th edition, Pearson India Education Services Pvt. Limited, 2015
4	Alan V Oppenheim, A. S. Wlisky, “Signalsand Systems”, Prentice-Hall ofIndia Private Limited, 2008.
5	A.K.Jairath , “Problems and Solutions of Control Systems” , CBS Publishers, 2022.

ANTENNAS AND WAVE PROPAGATION

PC412EC

Instruction: 3 periods per week

Duration of SEE: 3 hours

CIE: 30 marks

SEE: 70 marks

Credits: 3

Prerequisites: Electromagnetic Theory & Transmission Lines (PC405EC)

Course Objectives:

1.To describe the basic principles of antennas and introduce the antenna terminologies.
2.To discuss the working principles of wire antennas, non-resonant antennas, antenna arrays and techniques for measurement of antennas characteristics.
3.To explain the various modes of radio wave propagation.

Course Outcomes: On successful completion of the course, the students will be able to

1.illustrate the basic principles of antennas and learn the antenna terminology.
2.apply the design considerations of different types of wire antennas and make proficient in analytical skills for understanding practical antennas
3.analyse the non-resonant antennas for various ranges of frequencies and get updated with latest developments in the smart antennas.
4.apply the principles and design considerations of antennas as well as antenna arrays, measure standard antenna parameters and obtain awareness about radiation hazards.
5.understand and compare various modes of radio wave propagation used for different applications.

UNIT – I

Antenna Fundamentals: Introduction, principle of radiation, isotropic radiator, basic antenna parameters: radiation pattern, beam area, radiation intensity, beam efficiency, directivity, gain, resolution, antenna apertures, effective length and effective area, Friis transmission equation, fields from oscillating dipole, antenna field zones, antenna polarization, front-to-back ratio, antenna theorems, antenna impedance and antenna temperature. Retarded potential: Lorentz and Coulomb gauge conditions.

UNIT – II

Thin Linear Wire Antennas: Introduction, current distributions, radiation from infinitesimal/short dipole or an alternating current element, half-wave dipole and quarter wave monopole, loop antennas-small loop, comparison of far fields of small loop and short dipole, far field pattern of circular loop with uniform current, radiation resistance of loops, slot antennas, helical antennas- helical geometry, helix modes: transmission and radiation, practical design considerations for monofilar helical antenna in axial modes, wideband characteristics of monofilar helical antenna radiating in axial mode, radiation efficiency.

UNIT – III

Non-Resonant Antennas: Comparison between resonant and non-resonant antennas, Long-wire antennas: V-antenna and Rhombic Antenna, Yagi-Uda Antenna, Folded dipole antennas, Broadband and frequency-independent concept, Log-periodic Antenna, Aperture Antennas-Huygen's principle, Babinet's principle, Radiation from Horns and design considerations, Parabolic Reflector and Cassegrain Antennas, Lens Antennas, Micro Strip Antennas- Basic

characteristics, feeding Methods, Design of Rectangular Patch Antennas, Smart Antennas-Fixed weight and Adaptive Beam forming.
UNIT – IV
Antenna Arrays: Array of point sources, two element array with equal and unequal amplitudes, different phases, linear n-element array with uniform distribution, Broadside and End fire arrays, Principle of Pattern Multiplication, Effect of inter element phase shift on beam scanning, Binomial array. EFA with Increased Directivity, Derivation of their characteristics and comparison; Effects of Uniform and Non-uniform Amplitude Distributions. Antenna Measurements: Introduction, Basic Concepts-Reciprocity, Near and Far fields, Source of Errors, Antenna Test Site. Measurement setup and distance criterion for directional patterns, gain (absolute and comparison methods) and impedance, Radiation Hazards.
UNIT – V
Wave Propagation: Ground, Space and Surface waves, Troposphere refraction and reflection, Duct propagation, Sky wave propagation, Regular and irregular variations in ionosphere Line of sight propagation.

Suggested Reading:

1.	J. D. Kraus, R. J. Marhefka, and Ahmad S. Khan, “Antennas and Wave Propagation”, McGraw-Hill, 4 th Edition, 2010.
2.	Constantine A. Balanis, “Antenna Theory: Analysis and Design”, 3 rd Edition, John Wiley, 2005.
3.	Edward C. Jordan and Keith G. Balmain, “Electromagnetic Waves and Radiating Systems”, 2 nd Edition, PHI, 1968.
4.	Robert E. Collin, “Antennas and Radiowave Propagation”, McGraw-Hill, 1985.
5.	A.R.Harish and M. Sachidananda, “Antennas and Wave Propagation”, Oxford University Press, 2007.

INDUSTRIAL ADMINISTRATION AND FINANCIAL MANAGEMENT

HS104ME

Instruction: 3 periods per week

CIE: 30 marks

Prerequisites: Finance and Accounting (HS103CM)

Duration of SEE: 3 hours

SEE: 70 marks Credits: 3

Course Objectives

1.To understand various types of organizational structures, manufacturing processes and importance of plant layout and the role of scheduling function in optimizing the utilization of resources.
2.To understand the importance of quality, inventory control and concepts like MRP I and MRPII.
3.To understand the nature of financial management and concepts like breakeven analysis, depreciation and replacement analysis.

Course Outcomes

After completing this course, the student will be able to

1.Understand the different phases of product life cycle, types of manufacturing systems, plant layout optimization problems and role of scheduling function in better utilization of resources.
2.Understand the Fundamental concepts of quality control, process control, material control and appreciate the importance of MRP-I and MRP—H.
3.Know the different terminology used in financial management and understand the different techniques of capital budgeting and various types of costs involved in running an industrial organization.

UNIT-I
Industrial Organization: Types of various business organisations, organization structures and their relative merits and demerits. Functions of management. Plant Location and Layouts: Factors affecting the location of plant and layout. Types of layouts and their merits and demerits.
UNIT-II
Work Study: Definitions, objectives of method study and time study. Steps in conducting method study. Symbols and charts used in method study. Principles of motion economy. Calculation of standard time by time study and work sampling. Performance rating factor. Types of ratings. Jobs evaluation and performance appraisal. Wages, incentives, bonus, wage payment plans.
UNIT-III
Inspection and Quality Control: Types and objectives of inspection S.Q.C., its principles. Quality control by chan and sampling plans. Quality circles, introduction to ISO.
UNIT-IV
Optimization: Introduction to linear programming and its graphical solutions. Assignment problems.Project Management: Introduction to CPMand PERT. Determination of critical path.Material Management: Classification of materials, Materials planning. Duties of purchase manager.Determination of economic ordering quantities. Types of materials purchase.
UNIT-V
Cost Accounting: Elements of cost(Various costs) types of overheads, Breakeven analysis and its applications. Depreciation. Methods of calculating depreciation fund. Nature of financial

management. Time value of money. Techniques of capital budgeting and methods. Cost of Capital, Financial leverage.

Suggested Reading:

1.	Pandey I M, "Elements of Financial Management", Vikas Publications House New Delhi 1994
2.	Khanna O P, "Industrial Engineering and Management", Dhanpat Rai & Sons.
3.	Marshall/Bansal, "Financial Engineering", PHI.
4.	Keown, "Financial Management", 9 th edition, PHI.
5.	Chandra Bose, "Principles of Management & Administration", PHI.

MICROPROCESSOR AND MICROCONTROLLER LAB

PC455EC

Instruction: 2 periods per week

CIE: 25 marks

Credits: 1

Duration of SEE: 3 hours

SEE: 50 marks

Course Objectives:

1. Apply assembly language programs on 8086 trainer kit in standalone/serial mode.
2. Classify interface modules into input/output and memory interfaces with 8086.
3. Develop and execute the assembly language programming concepts of 8051 microcontroller and for various interface modules.

Course Outcomes: On successful completion of the course, the students will be able to

1. apply different addressing modes and model programs using 8086 Instruction set.
2. explain the usage of string instructions of 8086 for string manipulation, and comparison.
3. develop interfacing applications using 8086 processor.
4. develop different programs using C cross compilers for 8051 microcontroller.
5. develop interfacing applications using 8051 microcontroller.

List of Experiments

PART-A

1. Use of 8086 trainer kit and execution of programs. (Instruction set for simple Programs using 4 to 5 lines of instruction code under different addressing modes for data transfer, manipulation, and arithmetic operations).
2. Branching operations and logical operations in a given data.
 - i) Transfer byte and word data from source to destination memory.
 - ii) Count even and odd numbers from given array of bytes.
 - iii) Find Largest and Smallest number from given array of words.
 - iv) Sort the given array in ascending order, descending order.
3. Multiplication and Division
 - i) Use MUL and IMUL for Unsigned and signed multiplication on 8bit and 16 bit sets.
 - ii) Use DIV and IDIV for Unsigned and signed division on 8bit and 16 bit datasets.
 - iii) Obtain given decimal number to unpacked BCD ex: 123410 as 01,02,03,04 and store in memory using DIV.
 - iv) Find Factorial of a given number using multiplication instructions.
4. Single byte, multi byte Binary and BCD addition and subtraction.
5. Code conversions.
 - i) BCD Unpacked to Packed BCD code.
 - ii) ASCII code to BCD code.
 - iii) BCD to ASCII code.
6. String Searching and Sorting. (Using string instructions)
 - i) Find number of repetitions of a character in a string.
 - ii) Find and replace a character in the given string.
 - iii) Convert Case of a given string.
 - iv) Find whether given string is palindrome or not.

PART B

[Experiments for 8051 using any C-Cross Compiler & appropriate hardware]

1. Familiarity and use of 8051/8031 microcontroller trainer, and execution of programs.
2. Instruction set for simple programs (using 4 to 5 lines of instruction code).
3. Timer and counter operations & programming using 8051.
4. Serial communications using UART.
5. Programming using interrupts.
6. Interfacing 8051 with DAC to generate waveforms.
7. Interfacing traffic signal control using 8051.
8. Program to control stepper motor using 8051.
9. ADC interfacing with 8051.
10. Serial RTC interfacing with 8051.
11. LCD interfacing with 8051.

- NOTE:**
1. At least ten experiments to be conducted in the semester.
 2. Minimum of 5 from Part A and 5 from Part B is compulsory.
 3. In Part-B, perform the experiments using assembler simulators like edsim51/Keil software.

SYSTEMS AND SIGNAL PROCESSING LAB**PC456EC***Instruction: 2 periods per week**CIE: 25 marks**Credits: 1**Duration of SEE: 3 hours**SEE: 50 marks***Course Objectives:**

1. To develop C & MATLAB programs for operation of sequences.
2. To implement the algorithms of DFT, IDFT, FFT and IFFT on discrete time signals
3. To design and obtain the frequency response of various digital filters.

Course Outcomes: On successful completion of the course, the students will be able to

1. develop MATLAB files for the verification of system response.
2. design and analyze the digital filters using MATLAB
3. verify the functionality of FFT algorithms.
4. experiment with multirate techniques using MATLAB & CCS
5. design and implement the digital filters on DSP processor

PART-A**List of Signal Processing Experiments****Perform the following programs using MATLAB Simulator**

1. Introduction to MATLAB and signal generation.
2. Perform Linear Convolution.
3. Perform Circular Convolutions.
4. Perform DFT and FFT algorithm
5. Perform FIR filters design using different window functions.
6. Perform IIR filters design: Butterworth and Chebyshev, LPF, HPF, BPF & BSF filter.
7. Perform Interpolation and Decimation.
8. Implementation of multi-rate systems.

PART-B**List of DSP Processor Experiments****Implement the following experiments using DSK (TMS320C67XX)**

1. Introduction to DSP processors and Study of procedure to work in real-time.
2. Implement Solution of difference equations
3. Implement Impulse Response.
4. Implement Linear Convolution.
5. Implement Circular Convolution.
6. Implement Fast Fourier Transform Algorithms.
7. Design of FIR (LP/HP) USING windows: (a) Rectangular (b) Triangular (c) Hamming windows.
8. Design of IIR (HP/LP) filters.

NOTE:

1. At least ten experiments to be conducted in the semester.
2. Minimum of 5 from Part A and Part B is compulsory.
3. For Section-A 'MATLAB with different toolboxes like signal processing.
4. Blockset and SIMULINK/MATHEMATICA/any popular software can be used.

MINI PROJECT

PW701EC

Instruction: 2 periods per week

Duration of SEE: NA

CIE: 50 marks

SEE: NA

Credits: 2

Course Objectives:

1. To conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
2. To provide training in soft skills and also train them in presenting seminars and technical report writing.
3. To design, implement and test the prototype/algorithm in order to solve the conceived problem.

Course Outcomes: On successful completion of the course, the students will be able to

1. get practical experience of software design and development, and coding practices within Industrial/R&D Environments.
2. gain working practices within Industrial/R&D Environments
3. prepare reports and deliver effective presentation.
4. demonstrate effective written and oral communication skills
5. innovate in various engineering disciplines and nurture their entrepreneurial ideas.

Guidelines for Mini Project

1. The mini-project is a team activity having maximum of 3 students in a team. This is electronic product design work with a focus on electronic circuit design.
2. The mini project may be a complete hardware or a combination of hardware and software. The software part in mini project should be less than 50% of the total work.
3. Mini Project should cater to a small system required in laboratory or real life.
4. It should encompass components, devices, analog or digital ICs, micro controller with which functional familiarity is introduced.
5. After interactions with course coordinator and based on comprehensive literature survey/ need analysis, the student shall identify the title and define the aim and objectives of mini-project.
6. Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and submit the proposal within first week of the semester.
7. The student is expected to exert on design, development and testing of the proposed work as per the schedule.
8. Art work and Layout should be made using CAD based PCB simulation software. Due considerations should be given for power requirement of the system, mechanical aspects for enclosure and control panel design.
9. Completed mini project and documentation in the form of mini project report is to be submitted at the end of semester.
10. The tutorial sessions should be used for discussion on standard practices used for electronic circuits/product design, converting the circuit design into a complete electronic product, PCB design using suitable simulation software, estimation of power budget analysis of the product, front panel design and mechanical aspects of the product, and guidelines for documentation /report writing.