Course Title	MICROPROCESSORS & INTERFACING				B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504501	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To become familiar with 8085 & 8086 Microprocessor Architecture, Instructions, Operating Modes and Programming.
- To use 8086 microprocessor for various applications.
- To study various peripherals for microprocessor based systems.

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

CO 1	Define various components and list out various features of microprocessors and peripherals.
CO 2	Describe the internal block diagram of microprocessors and peripherals, addressing modes, instruction set and data transfer schemes.
CO 3	Develop algorithm and assembly language programs to solve problems
CO 4	Apply an appropriate algorithm, program and peripheral for the application.
CO 5	Design the microprocessor based system to solve real time problems. (Prepare a case study model to get a first prototype)

UNIT I

Introduction to 8085 Microprocessor: Development of microprocessors, 8085 Microprocessor - Architecture, Organization, Instruction set, Addressing modes, Basic Timing Diagrams, Interrupts and Simple Programs.

UNIT II

Introduction to 8086 Microprocessor: 8086 Microprocessor - Architecture, Organization, Instruction set, Addressing modes, Interrupt system. Pin diagram, Minimum mode 8086 system and timings, Maximum mode 8086 system and timings.

UNIT III

Assembly Language Programming: Assembler directives, Assembly language programs (8086) with Assembler directives for addition, subtraction, multiplication, division etc., sorting and searching, bit manipulation, look-up tables, string manipulations, Macros and Delay subroutines, Debugging.

UNIT IV

Data transfer schemes and Peripheral Interfacing: Synchronous, Asynchronous, Interrupt driven and DMA type schemes, 8255 PPI and its interfacing, Programmable Communication Interface (8251 USART) and its interfacing, Programmable Interval Timer (8254) and its interfacing, Programmable interrupt controller (8259) and its interfacing, Programmable DMA controller (8257) and its interfacing.

UNIT V

Memory and I/O Interfacing to 8086: Address decoding techniques, Interfacing Static RAM and ROM chips, ADC and DAC Interfacing.

Case studies: Traffic light controller, Stepper motor control, Data acquisition, Temperature measurement and control.

Text Books:

1. Ramesh S. Gaonkar, “Microprocessor architecture, programming and its applications with 8085”, Penram Interantional Publications, 4th Edition.
2. A. K. Ray and K.M. Bhurchandi, "Advanced Microprocessors and Peripherals", TMH.
3. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware", 2nd Edition, Tata McGraw-Hill.
4. Barry B. Brey, “The Intel Microprocessors-Architecture, Programming and Interfacing”, 8th Edition, PHI

Reference Books:

1.Raj Kamal, Microcontrollers Architecture, Programming, Interfacing and System Design , Pearson Education, 2005.
2.Steve Furbur, ARM System onchip Architecture, 2nd Edition, Addison Wesley, 2000.
3.Y. Liu and Glenn A. Gibson, “Microcomputer Systems: 8086/8088 Family Architecture, Programming and Design”, 2nd Edition, PHI.
4.Y. Liu and Glenn A. Gibson, “Microcomputer Systems: 8086/8088 Family Architecture, Programming and Design”, 2nd Edition, PHI.

Course Title	LINEAR IC APPLICATIONS				B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504502	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To introduce Operational Amplifiers (Op-Amps)
- To give the concepts of design and analysis related to Op-Amp Applications as Timers, Phase Locked Loops (PLLs), Waveform Generators, Analog Filters and Data Converters

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

CO 1	Describe the DC and AC characteristics of Operational Amplifier and their compensation techniques.
CO 2	Understand the applications of Operational Amplifier.
CO 3	Analyze different analog active filters.
CO 4	Generate various waveforms using OP-Amp / 555 timers.
CO 5	Understand the principles of data converters.

UNIT-I

Differential amplifiers: Definition, DC and AC analysis of Dual input-Balanced output Differential Amplifier, Properties of other three differential amplifier configurations, Transfer characteristics of Differential Amplifier, Level Translator.

Operational Amplifiers: Ideal op-amp Characteristics, Internal circuit of Op-Amp, Block diagram of Commercial IC Op-Amp, FET input op-amp, DC and AC characteristics of Op-Amp, Frequency Compensation.

UNIT-II

Basic Op-Amp Applications: Ideal Inverting and Non-Inverting Amplifiers, Voltage Follower, Summer, Subtractor, Differentiator - Ideal Differentiator, Practical Differentiator, Integrator - Ideal Integrator, Practical Integrator, Instrumentation amplifier, DC and AC Amplifiers, V to I and I to V converters, Precision rectifiers, Sample and Hold Circuit.

UNIT-III

Comparators and waveform generators: Principle of Comparator, Schmitt Trigger, Astable Multivibrator, Monostable Multivibrators, Triangular Wave Generator.

Active Filters: Introduction to Analog Active Filters, Design and analysis of First Order Low Pass Filter and First Order High Pass Filter, Design and analysis of Second order Low pass Filter and Second Order High Pass Filter, Qualitative treatment of Band pass Filters and Band Reject Filters.

UNIT-IV

Sinusoidal Oscillators: Criterion for Oscillations,RC Phase Shift Oscillator, Wien Bridge Oscillator.

555 Timers: Functional block diagram and Pin diagram of 555 Timer, 555 Timer in Monostable Mode, 555 Timer in Astable Mode

Phase Locked Loops (PLLs): Basic principle of PLL, Components used in PLL, IC PLL (565), PLL applications.

UNIT-V

Digital to Analog Converters (DACs): Introduction, Basic DAC Technique, Weighted Resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC, IC 1408 DAC, DAC Specifications

Analog to Digital Converters (ADCs): Functional Diagram of ADC, 'Direct type' vs 'Integrating type' ADCs, Parallel Comparator (Flash) ADC, Successive Approximation AD, Dual Slope ADC, ADC Specifications.

Text Books:

1. D. Roy Choudhury and Shail Jain, "Linear Integrated Circuits", 2nd Edition, New Age, 2003
2. Ramakant A. Gayakward, "Op-amps and Linear Integrated Circuits", 4th Edition, Pearson Education, 2003
3. David A. Bell, 'Op-amp & Linear ICs', Oxford, 2013.
4. William D Stanley, "Operational Amplifiers with Linear Integrated Circuits", Pearson education India, 2002.

Reference Books:

1. James M. Fiore, "Opamps & Linear Integrated Circuits Concepts & Applications", Cengage, 2010.
2. Thomas L. Floyd and David M. Buchla, "Fundamentals of Analog Circuits", Pearson, 2013.
3. Jacob Millman and Christos C. Halkias, "Integrated Electronics - Analog and Digital Circuits and Systems", Tata McGraw-Hill, 2003
4. Robert F. Coughlin, Fredrick F. Driscoll, "Op-amp and Linear ICs", PHI Learning, 6th Edition, 2012.

Course Title	DIGITAL COMMUNICATIONS				B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504503	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- Introduce the students, the fundamentals of digital communication systems.
- To make students understand the analysis of digital communications system and fundamentals of channel coding.

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

CO 1	Describe the functioning of digital modulation techniques.
CO 2	Understand the requirements for various baseband digital transmission systems.
CO 3	Illustrate the functioning of Digital Communication system and concepts of information theory.
CO 4	Apply various methods of error control coding techniques
CO 5	Illustrate various Digital carrier modulation schemes

UNIT-I

Wave form coders: Review of sampling theorem, PCM system, Quantization noise, Companding, B.W. requirements of PCM, Differential PCM, Delta modulation, Adaptive delta modulation, Noises in PCM & Delta Modulation, TDM, Asynchronous TDM, Comparison of TDM & FDM.

UNIT-II

Base band data transmission: Characterization of band-limited channels, Design of band-limited signals for no inter symbol interference (ISI), The Nyquist criterion, Design of band limited signals with controlled ISI, Partial response signals, Transmitting & receiving filters for optimum performance, M-ary signaling scheme, Binary Vs M – ary, Equalization schemes, Eye diagrams.

UNIT-III

Digital Communication system and Information theory: Model of a digital communication system, Unit of information, Entropy, mutual information, channel models and channel capacity, Shannon's theorem-Shannon- Hartley theorem, Bandwidth, S/N trade-off, source encoding of discrete memory less source, shannon- Fano coding, Huffman coding, coding efficiency.

UNIT-IV

Error control coding: Linear block codes, matrix description, Hamming codes, Decoding, Binary cyclic codes, Algebraic structure, Encoding using shift register, syndrome calculation,

Burst and random error correcting codes- Convolutional codes, code tree diagram, state diagram, trellis diagram Encoders and decoding algorithms.

UNIT-V

Digital carrier modulation schemes: ASK, FSK (coherent & Non Coherent), PSK, DPSK, Baseband signal receiver, Optimum & matched filters, Correlator, Comparison of digital modulation schemes- Bandwidth requirement, Power requirement, Immunity to channel impairments, Equipment complexity, M-ary signaling schemes (8/16PSK, QPSK, QAM), Synchronization methods.

Text Books:

1. Simon Haykin, "Communication Systems", 2nd & 4th Edition, Wiley Estern
2. Sam Shanmugam,, K "Analog & Digital Communication Systems", John Willey & Sons
3. R.P. Singh & S.D. Sapre, "Communication Systems, Analog & Digital", Tata McGraw-Hill.
4. Shanmugam K Sam, "Digital and Analog Communication Systems", John Wiely and sons.

Reference Books:

1. George Kennedy and Bernard Davis, "Electronics & Communication System", TMH, 2004.
2. R.P. Singh & S.D. Sapre, "Communication Systems, Analog & Digital", Tata McGraw-Hill.
3. Taub, H & Schilling D.L.", Principles of Communication System, McGraw Hill, 3rd Edition, 2009.
4. Bernard Sklar, "Digital Communications", Prentice-Hall PTR, 2nd Edition, 2001.

Course Title	ANTENNA & WAVE PROPAGATION				B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504504	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- The student will learn the fundamental principles of transmission line theory related to communications including the propagation of signals on a transmission line and in free space.

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

CO 1	Define various antenna parameters
CO 2	Understand the radiation mechanisms of various antennas.
CO 3	Analyze characteristics of antenna arrays.
CO 4	Examine the antenna measurements.
CO 5	Analyze the effects of atmosphere on wave propagation.

UNIT- I

Antenna Basics: Introduction, Basic antenna parameters- patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Effective height, Antenna Apertures, Friis transmission formula, Illustrative problems. Fields from oscillating dipole, Antenna temperature, front–to-back ratio, basic Maxwell's equations, retarded potential-Helmholtz Theorem, Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole – Current Distributions, Field Components, Radiated power, Radiation Resistance, Beam width, Directivity, Effective Area and Effective Height, Natural current distributions, far fields.

UNIT- II

Antenna Arrays: Point sources- Definition, Patterns, arrays of 2 Isotropic sources. Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, End fire Arrays, Derivation of their characteristics and comparison, BSA with Non-uniform Amplitude Distributions, Bionomial Arrays.

UNIT- III

VHF, UHF AND Microwave Antennas: Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Helical Antennas, Horn Antennas, Parabolic Reflector, Micro strip Antennas.

Antenna Measurements: Introduction, Directivity Measurement, Gain Measurements (by comparison, Absolute and 3-Antenna Methods).

UNIT- IV

Wave Propagation-I: Introduction, Characterizations and general classifications, different modes of wave propagation, Ray/ Mode concepts. Ground wave propagation (Qualitative treatment) - Introduction, Plane earth reflections, Space and surface waves, wave tilt, curved earth reflections. Space wave propagation- Introduction, field strength variation with distance

and height, effect of earth's curvature, absorption, Super refraction, M-curves and duct propagation, scattering phenomena, tropospheric propagation, fading and path loss calculations.

UNIT- V

Wave Propagation-II: Sky wave propagation- Introduction, structure of Ionosphere, refraction and reflection of sky waves by Ionosphere, Ray path, Critical frequency, MUF, LUF, OF, Virtual height and Skip distance, Relation between MUF and Skip distance, Multi-HOP propagation, Energy loss in Ionosphere, Summary of Wave Characteristics in different frequency ranges.

Text Books:

1. John D. Kraus, Ronald J. Marhefka and Ahmad S. Khan, "Antennas and wave propagation", TMH, New Delhi, 4th Edition, (Special Indian Edition), 2010.
2. E.C. Jordan and. Balmain, "Electromagnetic Waves and Radiating Systems", PHI, 2nd Edition, 2000.
3. C.A. Balanis, "Antenna Theory" John Wiley & Sons, 2nd Edition, 2001.
4. G. S. N. Raju, "Antennas and Wave Propagation", Pearson Education India, 2006.

Reference Books:

1. K.D. Prasad, "Antennas and Wave Propagation", Satya Prakashan, Tech India Publications, New Delhi, 2001.
2. F.E. Terman, "Electronic and Radio Engineering," McGraw-Hill, 4th Edition, 1955.
3. Warren L. Stutzman, Gary A. Thiele, "Antenna Theory and Design", John Wiley & Sons, 3rd Edition.
4. Richard C. Johnson, "Antenna Engineering Hand
5. book", McGraw-Hill, 1993.

Course Title	COMPUTER ORGANIZATION				B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1515505	PN	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To give the concepts related to Computer Organization and Design
- To introduce CPU, Memory, I/O Devices

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

CO 1	Recognize the basic concepts of various units of computer
CO 2	Classify the instruction cycle and microprogram examples.
CO 3	Understand the organization of Central Processing Unit.
CO 4	Describe the different hardware components associated with the input-output organization of a computer.
CO 5	Differentiate the memory organization of a computer.

UNIT-I

Basic Structure of Computers: Computer Types, Functional Units, Basic operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers.

Register Transfer and Micro Operations: Register transfer, Bus and Memory transfers, Arithmetic micro operations, Logic micro operations, Shift Micro Operations, Arithmetic Logic shift units.

UNIT-II

Basic Computer Organization and Design: Instruction codes, computer Registers and instructions, Timing and control, instruction cycles, memory- reference instructions, Input-Output and interrupt.

Microprogrammed Control: Control Memory, Address Sequencing, Micro Program Example, Design of Control Unit.

UNIT-III

Central Processing Unit: General register Organization, Stack Organization, Instruction formats, Addressing Modes, Program Control, RISC, Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline.

UNIT-IV

Input-Output Organization: Peripheral Devices, Input-Output interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, DMA, Input-Output Processor, Serial Communication.

UNIT-V

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual memory, Characteristics of Multiprocessors,

Interconnection Structures, Inter Processor Arbitration, Inter Processor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.

Text Books:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, "Computer Organization", 5th Edition, Tata McGraw-Hill.(Unit I-1chapter)
2. M. Moris Mano, "Computer Systems Architecture", 3rd Edition, Pearson/PHI.
3. William Stallings, Computer Organization and Architecture, 6th Edition, Pearson/PHI.
4. S Andrew S. Tanenbaum, Structured Computer Organization, 4th Edition, PHI/Pearson.

Reference Books:

1. P. Sivarama, Dandamudi, "Fundamentals or Computer Organization and Design", Springer Int. Edition.
2. John L. Hennessy and David A. Patterson, "Computer Architecture a quantitative approach", 4th Edition, Elsevier.
3. Joseph D. Dumas II, "Computer Architecture: Fundamentals and principles of Computer Design", BS Publication.
4. David A Patterson and John L Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Morgan Kaufmann; 4th edition.

Course Title	DIGITAL IC APPLICATIONS				B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504506	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To introduce VHDL and its language elements to design digital systems.
- Make students familiar with design of different combinational and sequential digital circuits.

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

CO 1	Understand CMOS, Bipolar logic families and fundamentals of VHDL Programming.
CO 2	Apply the concepts of VHDL for modeling and simulation of digital logic circuits.
CO 3	Analyze various Combinational and Sequential logic circuits.
CO 4	Model digital logic circuits using CMOS, BJT and ECL technologies.

UNIT-I

CMOS & Bipolar Logic: Introduction to logic families, CMOS logic, CMOS logic families, Bipolar logic, Bipolar logic families (TTL, ECL), ROM- Internal structure, Static RAM and Dynamic RAM.

UNIT-II

The VHDL Hardware Description Language: Design flow, program structure, types and constants, functions and procedures, libraries and packages. Structural design elements, data flow design elements, behavioral design elements, time dimension, simulation and synthesis.

UNIT-III

Combinational Logic Design: Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, Combinational multipliers. VHDL models for the above ICs.

UNIT-IV

Design Examples (USING VHDL): Design examples (using VHDL) - Barrel shifter, comparators, floating point encoder, dual parity encoder.

UNIT-V

Sequential Logic Design: Latches and flip-flops, PLDs, counters, shift register and their VHDL models, synchronous design methodology.

Text Books:

1. John F. Wakerly, "Digital Design Principles & Practices" PHI/Pearson Education Asia, 4th Edition, 2008.
2. J. Bhasker, "A Verilog HDL Primer", Star Galaxy Publishing; 3rd edition (January 31, 2005).

3. Fundamentals of Digital Logic with Verilog Design – Stephen Brown, Zvonko Vranesic, TMH, 3rd Edition, 2014
4. Verilog HDL – Samir Palnitkar, 2nd Edition, Pearson Education, 2009.

Reference Books:

1. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2009.
2. J. Bhasker, "A Verilog HDL Synthesis: A Practical Primer", Star Galaxy Publishing.
3. T.R. Padmanabhan, B Bala Tripura Sundari, Design Through Verilog HDL, Wiley 2009.
4. Zainalabdien Navabi, Verliog Digital System Design,TMH, 2nd Edition.

Course Title	IC APPLICATIONS LAB				B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504507	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		--	--	3	2	50	50	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

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

CO 1	Demonstrate the circuits with analog IC‟s (741, 555, 78XX/79XX, 723).
CO 2	Apply IC‟s (741, 555, 78XX/79XX, 723) in electronic applications.
CO 3	Design a digital system to meet required specifications.
CO 4	Test the functionality of system design with Test Benches.
CO 5	Test the results of designed digital system using FPGA.

Part A: Analog IC Application Lab:

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (first order).
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit DAC using OP AMP.
8. Precision Diodes

Part B: Digital IC Applications:

(Simulate the internal structure of the following Digital IC's using VHDL)

1. Logic Gates- 74XX.
2. Half Adder, Half Subtractor, Full Adder, Full Subtractor & Ripple Carry Adder.
3. 3-8 Decoder -74138 & 8-3 Encoder- 74X148.
4. 8 x 1 Multiplexer -74X151 and 2x4 Demultiplexer-74X155.
5. 4 bit Comparator-74X85.
6. D Flip-Flop 74X74.
7. JK Flip-Flop 74X109.
8. Decade counter-74X90.

Course Title	COMMUNICATION ENGINEERING LAB				B. Tech. ECE V Sem			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1504508	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		--	--	3	3	50	50	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- Design and generation of AM,PM, FM,ASK,PSK, QPSK communication techniques
- Usage of Communications test equipment.

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

CO 1	Use the knowledge of Amplitude, Frequency and Pulse Modulation Systems in developing analog Communication systems
CO 2	Use the knowledge of TDM, PCM, Delta Modulation, FSK, PSK, DPSK,QPSK in developing Digital Communication systems
CO 3	Perform measurements like Sensitivity, Selectivity and Fidelity of Communication subsystems and systems
CO 4	Use test equipment to test various communication systems they develop

Part- A: Analog Communication Lab:

1. Amplitude modulation and demodulation.
2. Frequency modulation and demodulation.
3. Characteristics of Mixer.
4. Pre-emphasis & de-emphasis.
5. Pulse Amplitude Modulation and demodulation.
6. Pulse Width Modulation and demodulation.
7. Pulse Position Modulation and demodulation.
8. Radio Receiver measurements – Sensitivity, Selectivity, & Fidelity.

Part- B: Digital Communication Lab:

1. Sampling Theorem – verification.
2. Time division multiplexing.
3. Pulse Code Modulation.
4. Delta modulation.
5. Frequency shift keying - Modulation and Demodulation.
6. Phase shift keying - Modulation and Demodulation.
7. Differential phase shift keying - Modulation and Demodulation.
8. QPSK - Modulation and Demodulation

Course Title	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS				B. Tech. ECE VI Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
1525601	**HS**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					**End Exam Duration: 3Hrs**		

Course Objectives:

- To equip the budding engineering student with an understanding of concepts and tools of economic analysis.
- Provide knowledge of managerial economics through differential economics concepts, accounting concepts are necessary to analyze and solve complex problems relating financial related matters in bog industries.
- An understanding of professional and ethical responsibility and ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- Recognition of the need for, and an ability to engage in life-long learning and to meet contemporary issues.

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

CO 1	Understand principles and concepts of Managerial Economics and Accountancy.
CO 2	Understand the Economic theories i.e., Demand, Production, Cost, Markets and Price.
CO 3	Describe different types of Markets and competition, forms of organization and Methods of Pricing.
CO 4	Examine the profitability of various Projects.
CO 5	Utilize tools and techniques to analyze and interpret the key parameters of financial performance.

UNIT-I

Introduction to Managerial Economics:

Definition, nature and scope of Managerial Economics – relation with other disciplines. Demand analysis – Determinants, Law of Demand and its exceptions – Elasticity of Demand – Types and Measurement of Elasticity of Demand – Methods of Demand Forecasting.

UNIT-II

Theory of Production And Cost Analysis:

Production Functions: Law of variable proportion, Isoquants and Isocost, least cost combination of inputs, Returns to Scale and Cobb- Douglas production function. Internal and external economies of scale.

Cost Analysis: Cost concepts – Break-Even Analysis (BEA) – Break Even Point – significance and limitations of BEA.

UNIT-III

Introduction to Markets and Pricing

Markets Structures: Perfect and Imperfect competition – features of Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly.Price- Output determination under perfect competition, monopoly and monopolistic competition – Price rigidity in Oligopoly.

Methods of Pricing: Cost plus pricing, marginal cost pricing, skimming pricing, penetration pricing, differential pricing and administrative pricing.

UNIT-IV

Business Organizations and Capital Budgeting

Business Organizations: Types of business organizations- Sole Proprietorship, Partnership, Joint Stock Company, Public Ltd and Private Ltd companies, Public Private Partnership (PPP).

Capital Budgeting: Types of capital, methods and sources of raising Capital. Capital Budgeting Techniques: Payback Period Method, Accounting Rate of return (ARR) and Net Present Value Method (NPV) (simple problems).

UNIT-V

Financial Accounting and Analysis:

Double Entry Book keeping, Journal, Ledger, Trail Balance – Final Accounts (Preparation of Trading Account, Profit and Loss Account and Balance Sheet without adjustments). Analysis and interpretation of financial statements through ratios (Liquidity, Profitability and Activity Ratios) (Simple problems).

TEXT BOOKS:

1. Varshney & Maheswari, Managerial Economics, Sultan Chand Publishers, 2009.
2. Prasad and K.V.Rao, Financial Accounting, jaibharth Publishers, Vijayawada.
3. MithaniDM, Introductory Managerial economics for BMS; PERASON
4. Salvatore Dominick, Management science :Principles and world wide application, PEARSON

REFERENCES:

1. P.L Mehtha: Managerial Economics, Sulthan Chand Publishers
2. M.Sugunatha Reddy: Managerial Economics and Financial Analysis, Research India Publication, New Delhi, 2013.
3. Paul A Samuleson and William nordhaus : Economics, Oxford University Publications.
4. M L Jhingan : Micro Economics & Macro Economics, Vrinda Publacations (P) Ltd.

Course Title	DIGITAL SIGNAL PROCESSING				B. Tech. ECE VI Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504602	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To become familiar with Discrete Fourier Transform and its efficient computation.
- To understand various IIR and FIR realization techniques.
- To know the design of IIR and FIR filters.

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

CO 1	Apply Z-Transforms in digital system design
CO 2	Write algorithms for Fast Fourier Transforms
CO 3	Realize Digital Filters
CO 4	Design IIR and FIR filters for the desired characteristics.

UNIT-I

Z–Transforms: Review of Discrete-time signals and systems, z-transform- definition, ROC and its properties, analysis of LTI system using z-transform, The Inverse z-transform using-contour integration, long division, inspection method, convolution method & residue method. Z-transform properties, solution of linear constant coefficient difference equations using z-transforms.

UNIT-II

Discrete Fourier series: DFS representation of periodic sequences, Properties of discrete Fourier series, Discrete Fourier Transform (DFT), properties of DFT, linear convolution of sequences using DFT.

Fast Fourier Transforms: Efficient computation of the DFT, Decimation in time and decimation in frequency FFT algorithms, FFT algorithms for composite N.

UNIT-III

Realization of Digital Filters: Block diagram representation of linear constant-coefficient difference equations, basic structures of IIR filters- direct form I, direct form II, transposed form, cascade form, parallel forms, basic structures of FIR filters-Direct form, Cascade form, Linear phase structure, Lattice structures.

UNIT-IV

IIR Digital Filters: General considerations-Causality and its implications, Characteristics of Practical Frequency-selective filters, Design of analog filters-Butterworth and chebyshev approximations, IIR filter design by backward difference, Impulse Invariance, Bilinear transformation, design examples: frequency transformations, Illustrative Problems.

UNIT-V

FIR Digital Filters: Symmetric and Anti-symmetric FIR filters, Design of Linear Phase FIR digital filters using windows, Frequency sampling technique, comparison of IIR and FIR filters, Illustrative Problems, applications of DSP (Dual Tone Multifrequency signal detection, Spectral analysis of sinusoidal and nonstationary signals).

Text Books:

1. A.V.Oppenheim and R.W. Schaffer, & J R Buck, "Discrete Time Signal Processing," 2nd ed., Pearson Education, 2012.
2. John G. Proakis, Dimitris G. Manolakis, "Digital signal processing, principles, Algorithms and Aapplications", Pearson Education/PHI, 4th Edition, 2007.
3. Sanjit K Mitra, "Digital signal processing", A computer base approach- Tata McGraw-Hill, 3rd Edition, 2009.
4. Alan V. Oppenheim and Ronald W Schafer, "Digital Signal Processing", Pearson publications, 2015.

Reference Books:

1. Andreas Antoniou, Digital signal processing: Tata McGraw-Hill, 2006.
2. Digital signal processing: M H Hayes, Schaum's Outlines, Tata McGraw-Hill, 2007.
3. A. Anand Kumar, "Digital Signal Processing," PHI Learning, 2011.
4. Richard G. Lyons, "Understanding Digital Signal Processing", Pearson, 3rd Edition

Course Title	MICROWAVE ENGINEERING				B. Tech. ECE VI Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1504603	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To impart Knowledge about various microwave components, microwave junctions, microwave tubes and microwave signal characteristic measurements

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

CO 1	Use Wave guide and Microwave components for various applications.
CO 2	Analyze various micro Wave Oscillators and Amplifiers
CO 3	Describe fabrication of striplines and MICs & microwave bench setup for various microwave measurements.
CO 4	Determine S – parameters of various microwave devices .
CO 5	Compute microwave signal parameters, power output and efficiency of microwave active devices.

UNIT-I

Microwave tubes-I: Limitations and losses of conventional tubes at microwave frequencies. Microwave tubes-O type and M type classifications. O type tubes: Two cavity klystron-structure, Reentrant cavities, Velocity modulation process and Applegate diagram, Bunching process and small signal theory-Expressions for output power and efficiency. Reflex Klystron – structure, Velocity Modulation, Applegate diagram, Mathematical theory of bunching, Output power, efficiency, Oscillating modes and output characteristics, Effect of repeller Voltage on output Power, Illustrative Problems.

UNIT-II

Helix TWTS: Significance, Types and characteristics of slow wave structures; Structure of TWT and amplification process, Suppression of oscillations, gain considerations.

M -Type Tubes: Introduction, Magnetrons, Different types, Cylindrical magnetron-Hull cutoff and Hartree conditions, Modes of resonance and PI-mode operation, Separation of PI-mode, Output characteristics, Illustrative Problems.

UNIT-III

Microwave Solid State Devices: Classification , applications, Tunnel diode, Gunn diode-principles, RWH theory, Characteristics, Basic modes of operation - Gunn oscillation modes, IMPATT diode, PIN diode, Varactor diode, Crystal diode, Schottky Barrier diode, Parametric amplifier.

UNIT-IV

Microwave Components: Microwave hybrid circuits-S-parameters of two port network, Attenuators, Phase shifters, Wave guide Tees and their S-matrices, Bends, Corners and twists. Two hole Directional coupler and its S-matrix, Ferrites-composition and characteristics, Faraday rotation, Gyrator, Isolators and circulators, S-matrix of circulator and isolator.

UNIT-V

Microwave Measurements: Measurement of frequency, Power, VSWR, Impedance, Reflection coefficient, Attenuation constant, S-parameters and Q of a cavity Resonator.

Microwave ICs: Advantages of MICs, Hybrid MICs, Monolithic MICs- advantages, materials and fabrication, Striplines and micro striplines.

Text Books:

1. Samuel Y Liao, "Microwave devices and circuits", Prentice Hall, 1999.
2. M. Kulkarni, "Microwave and Radar Engineering", Umesh Publications, 1998.
3. Annapoorna Das and Sisir K. Das, "Microwave Engineering", Tata McGraw-Hill, 2000.
4. R. E. Collin, "Foundations for microwave engineering," IEEE press, John Wiley, 2nd Edition, 2002.

Reference Books:

1. Herbert J. Reich, J. G. Skalnik, P. F. Ordung and H. L. Krauss, "Microwave principles," CBS publishers and distributors, New Delhi, 2004.
2. Om. P. Gandhi, "Microwave Engineering and Applications," Pergamon, 1981.
3. David M. Pozar, "Microwave Engineering", Wiley; Fourth edition.
4. Frank Gustrau, "RF and Microwave Engineering", Wiley; 1st edition.

Course Title	CONTROL SYSTEMS					B. Tech. ECE VI Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1512604	PN	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- To introduce to the students the principles and applications of control systems in everyday life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems.
- To deals with the different aspects of stability analysis of systems in frequency domain and time domain and to design compensators in frequency domain to improve the performance.

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

CO 1	Demonstrate knowledge on modelling physical systems.
CO 2	Analyze the stability of the system in time and frequency domains
CO 3	Design lag, lead, lag-lead compensators in frequency domain
CO 4	Evaluate steady state error and static error constants

UNIT-I

Control System Concepts: Introduction to Control Systems, Classification. Transfer function, Effect of feedback, mathematical modelling of Physical Systems, block diagram, reduction techniques – signal flow graphs and mason's gain formula. Transfer function of simple electrical systems.

UNIT-II

Time Domain Analysis: Standard test signals, Time response of first and second order systems- Time response specifications – Steady state error and error Constants- Response of P, PI, and PID Controllers.

UNIT-III

Concept of Stability and Root Locus: The Concept of Stability, necessary Conditions for stability – Routh Hurwitz's Criterion – Limitations of Routh's stability – Root Locus Concept – Construction of Root Loci, Effect of Poles & Zeros on stability.

UNIT-IV

Frequency Domain Analysis: Introduction, Correlation between time and frequency response, Frequency domain Specifications. Bode Plots, Nyquist stability Criterion - Gain and Phase margin.

UNIT-V

Compensation Techniques for Linear Control Systems: System Design and Compensation – Realization of basic lead, lag and lead – lag cascade Compensations in frequency domain.

Text Books

1. I. J. Nagrath and M. Gopal, "Control Systems Engineering", New Age International (P) Limited, Publishers, 5th edition, 2007.
2. B. C. Kuo and Farid Goinaraghi, "Automatic Control Systems", John Wiley and Son's, 8th edition, 2003.
3. A. Anand Kumar, "Control Systems", Prentice Hall of India Pvt. Ltd.
4. A. Nagoor Kani, "Control System Engineering", RBA PUB.

Reference Books

1. "Modern Control Engineering" by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 5th edition, 2010.
2. Norman S. Nise, "Control Systems Engineering", John wiely publications, 8th Edition.
3. Richard Dorf and Robert Bishop, "Modern Control Systems", Pearson; 13th edition.
4. SP Eugene Xavier and | J Joseph Cyril Babu, "Principles of Control Systems**",** S. Chand Publishing.

Course Title	MICROCONTROLLERS AND APPLICATIONS				B. Tech. ECE VI Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
1504605	**PJ**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					**End Exam Duration: 3Hrs**		

Course Objectives:

- To become familiar with 8051, ARM Microcontroller Architecture, Instructions, Programming.

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

CO 1	Define various components and list out various features of microcontrollers.
CO 2	Describe the internal block diagram of microcontrollers, addressing modes, instruction set ,physical design ,logical design of IOT,IOT levels.
CO 3	Develop algorithm and assembly language programs to solve problems.
CO 4	Apply an appropriate algorithm, program and peripheral for the application.
CO 5	Design the microcontroller based system to solve real time problems.

UNIT I

The 8051 Architecture: Introduction, architecture of 8051, pin diagram, memory organization, external memory interfacing, stack, addressing modes, instruction set.

UNIT II

The 8051 Programming: Assembler directives, Assembly Language programs and Time delay Calculations.

8051 Interrupts and Timers/Counters: 8051 interrupt structure, 8051 counters and Timers, programming 8051 timers.

UNIT III

ARM Architecture: ARM Design philosophy, Registers, Program Status Register, Instruction pipeline, Interrupts and vector table, Architecture Revision, ARM Processor Families, Introduction to ARM 9 processor.

UNIT IV

ARM Programming Model: Addressing Modes, Instruction Set- Data Processing Instructions, Branch, Load-Store, Software interrupt, PSR instructions, Conditional instructions, Thumb instruction Set: Register Usage, Other Branch instructions, Data processing Instructions, Single-Register and Multi Register Load-Store Instructions, Stack, Software Interrupt Instructions.

UNIT V

Introduction to IOT: Introduction, Physical Design of IOT, Logical design of IOT, IOT enabling Technologies, IOT levels and Deployment Templates, Domain Specific IOTs.

Text Books:

1. The 8051Microcontroller and Embedded Systems, Mazidi Muhammad Ali, Mazidi Janice Gillespie & McKinlay Rolin D, 2nd Edition, Pearson Education, 2008.
2. ARM System Developer's Guide-Designing and Optimizing system software, Andrew N.Sloss, Dominic Symes, Chris Wright, Elsevier, 2008.
3. Y. Liu and Glenn A. Gibson, "Microcomputer Systems: 8086/8088 Family Architecture, Programming and Design", 2nd Edition, PHI.
4. Internet of Things A Hands-on-Approach, Vijay Madisetti & ArshdeepBahga, Universities Press,2015.

Reference Books:

1. The 8051 microcontroller: Architecture, Programming & Applications, Kenneth J Ayala, penram publications, 2nd edition.
2. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education, 2005.
3. Steve Furbur, ARM System onchip Architecture, 2nd Edition, Addison Wesley, 2000.
4. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware", 2nd Edition, Tata McGraw-Hill.

Course Title	DATA STRUCTURES				B. Tech. ECE VI Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1515606	PN	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To develop skills to design and analyze linear and non linear data structures
- To develop algorithms for manipulating linked lists, stacks, queues, trees and graphs
- To develop recursive algorithms as they apply to trees and graphs.

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

CO 1	Describe Data Types, primitive & non-primitive, and linear and non-linear data structures.
CO 2	Understand Arrays and Linked lists.
CO 3	Analyze Trees and Graphs
CO 4	Select appropriate searching technique and sorting technique

UNIT-I

Introduction: Concepts of Abstract Data Types (ADTs), Data Structures, primitive and non-primitive data structures, Linear and non-linear data structures. **Arrays**: Definition, single and Multidimensional arrays, Representation of arrays, Application of arrays, **Linked lists:** Representation of linked list in memory, Single inked list, Double linked list, Circular linked list, Operations on a linked list: Insertion, Insertion, Deletion, Traversal, Memory allocation and Garbage collection.

UNIT-II

Stacks: Abstract Data type, Stack operations: Push, Pop, Full and Empty, Array and linked implementation of stack, Applications of stack: Prefix and postfix expressions, Evaluation of postfix expression, Tower of Hanoi problem, Recursion. **Queues:** Abstract Data Type, Queue operations: Create, Add, Delete, Full and Empty, Array and linked implementation of queue, circular queue, Dequeue and priority queue.

UNIT-III

Trees: Basic Terminology, **Binary Trees:** Definition, properties, Array and linked representation, complete Binary Tree, Tree Traversal algorithms: Inorder, Preorder and Postorder, Heaps, Balanced Binary search Trees: AVL, Read-Black and splay Trees.

UNIT-IV

Graphs: Terminolgy, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency list, Adjacency Multilist, Graph Traversal: Depth First search and Breadth First Search, connected components, spanning Trees, Minimum cost Spanning Trees: Prims and Kruskal algorithm and Dijikstra Algorithm.

UNIT-V

Sorting: Selection, Insertion, Bubble, Merge, Quick, Heap and Radix sorting techniques, **Searching:** Sequential search, Binary search, comparison and Analysis.

Text books:

1 Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill.
2. Horowitz, Sahni, Anderson Freed, "Fundamentals of Data Structures in C", Universities press.
3. Varsha H.Patil, "Data Structures using C++", Oxford University Press.
4. Adam Drozdek, "Data structures and algorithms in C++", Course Technology Ptr; 4th edition.

Reference books:

1. Ananda Rao Akepogu and Radhika Raju Palagiri, "Data Structures, Algorithms and Applications in C++", Pearson Education.
2. S.Sahni, "Data Structures and Algorithms in C++", University Press (India) Private Limited, Second Edition.
3. Seymour Lipschutz, "Data Structures", Schaum's Outlines, McGraw Hill.
4. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education India; 3rd edition.

Course Title	COMPUTER NETWORKS				B. Tech. ECE VI Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1515607	PN	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To give the concepts of various network reference models and their layers
- To introduce cryptography

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

CO 1	Describe OSI and TCP/IP reference models and various types of networks.
CO 2	Understand the functionality of various layers of reference models.
CO 3	Classify the routing protocols and analyze how to assign the IP addresses for the given network.
CO 4	Identify types of transmission media with real time applications.
CO 5	Analyze the functionality of various protocols.

UNIT-I

Types of Networks: Reference Models-OSI reference model, TCP/IP reference model, OSI vs TCP. Network hardware architecture topologies, devices, Introduction to types of networks-optical networks, sensor networks

UNIT-II

Physical Layer: Transmission media, Guided and Unguided transmission media, communication Satellites.

Data Link layer: Design Issues, Error detection and Correction, Elementary and sliding window Data link protocols

UNIT-III

MAC & Network layers: Media Access Protocols, carrier senses multiple access, collision free protocols, Ethernet, Wireless LANs-Types.

Network layer: Network Layer design issues- Routing Algorithms, IPV4 and IPV6 protocols.

UNIT-IV

Transport Layer: Transport services, Elements of Transport protocols, simple Transport protocols-UDP-TCP- performance Issues.

UNIT-V

Application Layer: DNS, E-mail, WWW, multimedia.

Introduction to Cryptography: Basic concepts, firewalls.

Text Books:

1. Andrew S. Tanenbaum , "Computer Networks ", 4th Edition, Pearson Education.
2. S. Keshav, "An Engineering Approach to Computer Networks", International Student Edition, Addisson Wesley.
3. Chawan- Hwa Wu, Irwin, "Introduction to Computer Networks and Cyber Security", CRC.
4. Davie "Computer Networks", 5E, Peterson, , Elsevier.

Reference Books:

1. Behrouz A.Forouzan " Data communication and Networking", Tata McGraw-Hill,2004
2. James F.Kurose and Keith W.Ross," Computer Networking: A Top-Down approach featuring the Internet", Pearson Education, 3rd Edition 2003.
3. Douglas E. Comer, "Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1, , 5 th edition, PHI.
4. "Computer Networks and Internets with Internet Applications", Comer

Course Title	DATABASE MANAGEMENT SYSTEMS				B. Tech. ECE VI Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1515608	PN	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- Introduction to relational model and SQL
- To make students learn the various concepts related to the RDBMS

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

CO 1	Understand the E-R model.
CO 2	Describe the Relational Model and SQL for the most widely used relational databases.
CO 3	Analyze the Normalization Techniques for Database Administration.
CO 4	Illustrate the Query Processing and Transaction Management.

UNIT-I

Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database languages, Database Users and Administrators, History of Database Systems.

Introduction to the Relational Model - Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Database Design and the E-R Model - Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data.

UNIT-II

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database.

Intermediate SQL: Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization

Advanced SQL: Functions and Procedures, Triggers.

Formal Relational Query Languages: The Relational Algebra, the Tuple Relational Calculus, the Domain Relational Calculus.

UNIT-III

Schema Refinement and Normal Forms: Schema Refinement – Problems Caused by Redundancy, Decompositions, Problems related to decomposition. Reasoning about Functional Dependencies, First, Second, Third Normal forms, BCNF. Lossless join Decomposition, Dependency- preserving Decomposition. Schema refinement in Data base Design, Multi valued Dependencies, Fourth Normal Form, Join Dependencies, Fifth Normal Form, Inclusion Dependencies.

UNIT-IV

Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions

Query Optimization: Overview, Transformation of Relational Expressions, Estimating Statistics of Expression Results, Choice of Evaluation Plans.
Transactions: Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements.

UNIT-V

Concurrency Control: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multi version Schemes, Snapshot Isolation, Insert Operations, Delete Operations, and Predicate Reads, Weak Levels of Consistency in Practice.
Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, Early Lock Release and Logical Undo Operations, Remote Backup Systems.

Text Books:

1. Silberschatz, Korth, "Database system Concepts", 5th Edition, McGrawhill.
2. Raghurama Krishnan, Johannes Gehrke, "Data base Management Systems", 3rd Edition, Tata McGraw-Hill.
3. Korth, Silbertz, Sudarshan, Database Concepts, McGraw Hill
4. Date C J, An Introduction to Database Systems, Addision Wesley

Reference Books:

1. Elmasri, Navathe, "Fundamentals of Database Systems", Pearson Education.
2. Peter Rob, Ananda Rao and Carlos Corone, "Database Management Systems", Cengage Learning.
3. Bipin C. Desai, An Introduction to Database Systems, Gagotia Publications
4. Ramakrishnan"Database Management Systems",McGraw Hill

Course Title	MICROPROCESSORS AND MICRO-CONTROLLERS LAB				B. Tech. ECE VI Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
1504609	**PJ**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		--	--	3	2	50	50	100
Mid Exam Duration: 1Hr 30 Min					**End Exam Duration: 3Hrs**		

Course Objectives:

- To write 8086microprocessor and 8051 microcontroller programs for various operations
- Learning interfacing of processor with various Peripherals.

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

CO 1	Develop algorithm and assembly language programs to solve problems.
CO 2	Analyze abstract problems and apply a combination of hardware and software to address the problem.
CO 3	Choosing an appropriate algorithm, program and peripheral for the application.
CO 4	Design the microprocessor based system to solve real time problems.

Microprocessor 8086 & Microcontroller 8051: (Any four from 1 – 6. Experiments 7 and 8 are compulsory)

1. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
2. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
3. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
4. Reading and Writing on a parallel port.
5. Timer in different modes.
6. Serial communication implementation.
7. 8259 – Interrupt Controller: Generate an interrupt using 8259 timer.
8. 8279 – Keyboard Display: Write a small program to display a string of characters.

General Problems

Addition and Subtraction of two 8- bit/16 bit numbers, Multiplication of two 8-bit & two 16-bit numbers, Division of 16-bit by 8-bit and 32-bitby 16-bit number

1. Addition and Subtraction of 6 data bytes with 6-data bytes of another location.
2. Check the given Number is even or odd, Counting of 0's and 1's in a given data, Check the given number is logical palindrome or not.
3. Finding the maximum and minimum numbers in a given string of data.
4. Sorting the given numbers in ascending and descending order.
5. Finding the Factorial and Generating Fibonacci Series.

6. Conversion of BCD to hexadecimal number, Multiplication of two 3x3 matrices.
7. Addition, Subtraction, Multiplication, Division using Microcontroller.

Interfacing

1. Dual DAC interface (waveform generation).
2. Stepper motor control.
3. Display of flags using logic controller.
4. Traffic light controller.

Course Title	DIGITAL SIGNAL PROCESSING LAB				B. Tech. ECE VI Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504610	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		--	--	3	2	50	50	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs		

Course Objectives:

- To become familiar with MATLAB fundamentals
- To write MATLAB programme for basic DSP operations
- To understand the uses of TMS320C6748 processors
- To write C language code for basic DSP operations and executed using TMS processors

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

CO 1	Analyze discrete/digital signals using mat lab and the basic operations of signal processing.
CO 2	Obtain the spectral parameters of windowing functions.
CO 3	Design FIR and IIR filters for desired specifications
CO 4	Design and implement DSP algorithms in software using a computer language such as C with TMS320C6748 floating point processor.

List of Experiments: (Minimum of 5 experiments are to be conducted from each part)

Software Experiments (PART – A)

1. Generation and display of fundamental discrete-time sequences.
2. Finding Power and (or) Energy of a given discrete-time sequence.
3. Convolution of two discrete-time sequences with and without built in command.
4. Correlation between two discrete-time sequences with and without built in command.
5. DFT of a given signal with and without built in command.
6. Design of FIR filter using windowing technique.
7. Design of IIR filters using Impulse invariance or bilinear transformation.
8. Design of analog filters.

Using DSP Processor kits (Floating point) and Code Composure Studio (CCS) (PART – B)

1. Introduction to DSP Processors.
2. Generation of fundamental signals and plot the same as a waveform showing all the specifications.
3. Finding Power and (or) Energy of a given signal.
4. Convolution of two discrete-time sequences.
5. Correlation between two discrete-time sequences
6. DFT of a given signal
7. Design of FIR filter using windowing technique and verify the frequency response of the
   filter.

8. Design of IIR filter using any of the available methods and verify the frequency response of
   the filter.
9. Design of analog filters.

Equipment/Software Required:

1. Licensed MATLAB software with required tool boxes for 30 users.
2. DSP floating Processor Kits with Code Composure Studio (8 nos.)
3. Function generators
4. CROs
5. Regulated Power Supplies