DEPARTMENT OF
ELECTRONICS & COMMUNICATION ENGINEERING

Scheme of Instruction
and
Syllabi of

B.E. (ECE)

III/IV - I Semester

(With effect from 2016-2017)

VASAVI COLLEGE OF ENGINEERING
(Autonomous Institution Under UGC)
Ibrahimbagh, Hyderabad - 500 031.
Telangana.

VASAVI COLLEGE OF ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION

B.E. III/IV – I SEMESTER

S. No.	code	Subject	Scheme of Instruction				Scheme of Examination			
			Periods per week				Duration in Hrs.	Maximum Marks		Credits
			L	T	D	P		Ext. Exam	Sessio-nals	
THEORY										
1	EC 3010	Linear Integrated Circuits and Applications	3	1	-	-	3	70	30	3
2	EC 3020	Digital Integrated Circuits and Applications	3	1	-	-	3	70	30	3
3	EC 3030	Analog Communication	3	1	-	-	3	70	30	3
4	EC 3040	Microprocessors and Microcontrollers	3	1	-	-	3	70	30	3
5	EC 3050	Automatic Control Systems	3	-	-	-	3	70	30	3
6	EC 3060	Electronic Instrumentation	3	-	-	-	3	70	30	3
7	EC 3070	Finishing School – III: Technical skills	2	-	-	-	1½	35	15	1
8	HS 3110	Finishing School – III: Soft skills	2	-	-	-	1½	35	15	1
PRACTICALS										
9	EC 3311	Integrated Circuits Lab	-	-	-	3	3	50	25	2
10	EC 3321	Microprocessor and Microcontroller Lab	-	-	-	3	3	50	25	2
11	EC 3331	Networking Lab	-	-	-	3	3	50	25	2
		TOTAL	**22**	**4**	**-**	**9**		**640**	**285**	**26**
		GRAND TOTAL	**35**					**925**		

EC 3010

LINEAR INTEGRATED CIRCUITS AND APPLICATIONS

Instruction	3+1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• Students will acquire the knowledge of linear IC applications and design various circuits using IC's for any given specifications.	**At the end of the course students will be able to:** • Describe and analyze the internal circuits, parameters. Features of op-amp. • Design and analyze various applications of linear IC's 555, & 723 IC's • Distinguish various voltage regulators, analog to digital converters and digital to analog converters.

UNIT – I

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

Operational Amplifier: Op-amp Block Diagram, ideal Op-amp Characteristics, op-amp and its features, Op-Amp parameters & Measurements, Input and Output Offset voltages and currents, Slew Rate, CMRR, PSRR. Frequency Response and Compensation techniques.

UNIT – II

Op-amp Applications I: Inverting and Non-inverting Amplifiers with ideal and non-ideal

Op-amps, Voltage Follower, Difference Amplifier, Summing Amplifier, Ideal and Practical Integrator, Differentiator, V to I and I to V converters, Instrumentation Amplifier, Sample and Hold Circuit, Log and Antilog amplifiers, Precision Rectifiers.

UNIT – III

Op-amp Applications II: Schmitt Trigger with and without reference voltage, Astable Multivibrator, Monostable multivibrator, Triangular waveform generator.

Active Filters: Introduction, Butterworth 1^{st} order, 2^{nd} order low pass and high pass filters. Wide and Narrow Band-pass, Band-reject and All-pass filters.

UNIT – IV

Timer: Introduction to 555 timer and its functional diagram, Monostable, Astable and Schmitt Trigger applications.

IC Function Generator: Analysis and Design of Function Generators using IC 8038 Voltage Controlled Oscillator: Operation and Applications using IC 566.

Phase Locked Loops: Introduction, Principles, Block Schematic and Description of IC 565, Applications of PLL: Frequency multiplication and frequency synthesis.

UNIT – V

IC Regulators: Introduction, Analysis and design of regulators using 78XX and 723 monolithic ICs, Current limiting and Current foldback techniques using IC 723.

Data Converters: Introduction, basic Digital to Analog Converter techniques, Weighted Resistor DAC, Inverted R-2R Ladder DAC. Analog to Digital Converter: Types; Parallel Comparator ADC, Successive Approximation ADC and Dual Slope ADC. DAC and ADC specifications.

Suggested Reading:

1. David A. Bell, "*Operational Amplifiers and Linear ICs*," 3/e, Oxford Publications, 2011.
2. Roy, Chowdhury D., & Jain, Shail B., "*Linear Integrated Circuits*," 4/e, New Age International Publishers, 2010.
3. Sergio Franco, "*Design with Operational Amplifiers and Analog Integrated Circuits*," 3/e, TMH, 2008.
4. Ramakant A. Gayakwad, "*Op-Amps and Linear Integrated Circuits,*" 4/e, PHI, 2010.
5. K.R.Botkar, "*Integrated Circuits*," 10/e, Khanna Publishers, 2010.

EC 3020

DIGITAL INTEGRATED CIRCUITS AND APPLICATIONS

Instruction	3+1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• Student shall describe specifications of a digital IC for various logic families and design combinational and sequential circuits with digital ICs.	**At the end of the course students will be able to:** • Define specification of digital ICs • Classify various logic families and summarize their features. • Identify combinational, sequential circuits, memories and reconstruct them using digital ICs.

UNIT – I

Manufacturer's designations for integrated circuits, Development of integrated circuits, Integrated circuit package types, Pin identifications and temperate ranges, IC characteristics, Introduction to diode and transistor logic families. TTL logic family, TTL series, Output configurations, Open Collector, Totem pole, Tri State logic.

UNIT – II

Concept of negative logic, ECL logic family, MOS logic family (pMOS and nMOS) CMOS logic family and its characteristics, CMOS transmission gate (bilateral switch), and its applications, CMOS open drain and high impedance outputs. Dynamic MOS logic family, dynamic MOS inverter, dynamic NAND and NOR gates, Comparison of various logic families. Interfacing of CMOS and TTL driving CMOS ECL driving TTL and TTL driving ECL.

UNIT – III

Design using TTL-74XX and CMOS 40XX series: Demultiplexers, drivers for LED and LCD displays, Multiplexers and their applications, Parity generators and Checker circuits, Digital Comparator and Digital. Parallel and serial binary adder/subtractor circuits using 2's compliment, Multiplier, Decimal adder, look- ahead adder.

UNIT – IV

Flip-flops and their conversions, Design of Synchronous and Asynchronous counters, Decade Counters, Cascading of BCD counters, application of counters, Shift register and applications, Familiarity with 74 XX and CMOS 40XX series of IC Counters. Sequence detector.

UNIT – V

ROM, PROM, EPROM, EEPROM, RAM, Types, Architectures, operation and applications, NVRAM, Flash memory, CCD. Expanding word size and capacity. ASICs, Introduction to PLD's, Architectures of PAL, PLA with operation.

Suggested Reading:

1. Ronald J. Tocci, Neal S. Widmer & Gregory L. Moss, "*Digital Systems: Principles and Applications,*" PHI, 10/e, 2009.
2. Jain R.P., "*Modern Digital Electronics,*" 3/e, TMH, 2003.
3. Sonde, B. S., "*Introduction to system Design using IC's,*" Wiley, 2/e, 1994.
4. Morris R L and Miller J R, "*Designing with TTL Integrated Circuits*," TMH, 1971.

EC 3030

ANALOG COMMUNICATION

Instruction	3 +1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• To understand different types of analog modulation schemes employed in transceivers and evaluate their performance.	**At the end of the course students will be able to:** • Demonstrate of various analog modulation schemes. • Describe different types of analog receiver blocks. • Estimate the performance characteristics of analog communication systems.

UNIT – I

Linear Modulation schemes: Need for modulation, double side band suppressed carrier (DSB-SC) modulation, conventional Amplitude Modulation (AM). Hilbert transform, properties of Hilbert transform. Pre-envelop. Complex envelop representation of band pass signals, In-phase and Quadrature component representation of band pass signals. Low pass representation of band pass systems. Single side band (SSB) modulation and Vestigial-side band (VSB) modulation. Modulation and demodulation schemes

UNIT – II

Angle modulation schemes: Frequency Modulation (FM) and Phase modulation (PM), Concept of instantaneous phase and frequency. Types of FM modulation: Narrow band FM and wide band FM. FM spectrum in terms of Bessel functions. Direct and indirect (Armstrong's) methods of FM generation. Balanced discriminator, Foster–Seeley discriminator and Ratio detector for FM demodulation. Pre-Emphasis and De-Emphasis. Capture effect.

UNIT – III

Transmitters and Receivers: Classification of transmitters. High level and low level AM transmitters. FM transmitters. Principle of operation of Tuned radio frequency (TRF) and super heterodyne receivers. Selection of RF amplifier. Choice of Intermediate frequency. Image frequency and its rejection ratio, Receiver characteristics: Double spotting, Tracking and alignment, Automatic Gain Control.

UNIT – IV

Noise Sources and types. Atmospheric noise, Shot noise and thermal noise. Noise temperature. Noise in two-port network: noise figure, equivalent noise temperature and noise bandwidth. Noise figure and equivalent noise temperature of cascade stages. Narrow band noise representation. S/N ratio and Figure of merit calculations in AM, DSB-SC, SSB and FM systems.

UNIT – V

Analog pulse modulation schemes: Sampling of continuous time signals. Sampling of low pass and band pass signals. Types of sampling. Pulse Amplitude Modulation (PAM) generation and demodulation. Pulse time modulation schemes: PWM and PPM generation and detection.

Suggested Reading:

1. Simon Haykin, "*Communication Systems*," 4/e, Wiley India, 2011.
2. Herbert Taub, Donald L. Shilling & Goutam Saha, "*Principles of Communication Systems*," 3/e, TMH, 2008.
3. P. Ramakrishna Rao, "*Analog Communication*," 1/e, TMH, 2011.
4. A. Bruce Carlson and Paul B. Crilly, "*Communication Systems*," 5/e, 2011.
5. Singh, R.P. and Sapre, S.D., "*Communication Systems*," TMH, 2007.

EC 3040

MICROPROCESSORS AND MICROCONTROLLERS

Instruction	3+1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• Students will acquire knowledge about the architecture of various processors & 8051 controller interfacing 8086, 8051 with various I/O peripherals & memory to do a particular task.	**At the end of the course students will be able to:** • Understand an architectures of various processors • Interface various I/O peripherals and memory to a processor. • Develop a microprocessor based prototype for a particular application.

UNIT – I

8086/8088 Architecture and Instruction set: Minimum and Maximum mode operations, 8086 control signal interfacing under minimum mode system, control signal interfacing under maximum mode using multiprocessing systems. Addressing modes, Interrupt structure, Instruction formats, Instruction execution timings. Brief overview of x86 series microprocessors.

UNIT – II

8086 Assembly Language programming: Assembler directives and operators, programs using data transfer, arithmetic, logical, Branching and ASCII instructions. String processing, Procedures, Macros and stack, Basic programs using DOS functions. Introduction to assemblers and debugging tools.

UNIT – III

8086 Interfacing: Memory interfacing using standard RAM, EPROM IC Chips, 8255 PPI, 8253/8254 programmable interval timers, need for DMA and interfacing with DMA controller (8257 IC), Keyboard & display controller (8279) interfacing, programmable communication interface (8251). Serial and parallel data transmission formats, USART interfacing.

UNIT – IV

8051 Microcontroller: Classification, Internal architecture of 8051 and its pin configuration, Memory organization and expansion. 8051 instruction set, addressing modes and bit addressable features. Data transfer, arithmetic, logical and branching groups. Interrupt and I/O port structures and their operations. Assembly language Programming with 8051. 8051 timer and counter and its programming.

UNIT – V

Interfacing and Applications: 8051 Serial data communication and interrupt programming. 8051 Interfacing with external memory, expansion of I/O ports. A/D converter, D/A converter, Seven- segment display, LCD module, Keyboard and Stepper Motor interfacing with 8051.

Suggested reading:

1. Ray A.K & Bhurchandhi K.M, *"Advanced Microprocessor and Peripherals,"* 2/e, TMH, 2007.
2. Douglas V Hall, "*Microprocessors and Interfacing Programming and Hardware*," 2/e, THM, 2007.
3. Walter A. Triebal and Avtar Singh, "*The 8088 and 8086 Microprocessors Programming, Interfacing, Software, Hardware and Applications*," 4/e, Pearson Education, 2007.
4. Mazidi M.A, Mazidi J.G & Rolin D. Mckinlay, "*The 8051 Microcontroller & Embedded Systems using Assembly and C*," 2/e, Pearson Education, 2007.
5. Ayala K.J, "*The 8051 Micro Controller Architecture, programming and Application*," Penram International, 2007.

EC 3050

AUTOMATIC CONTROL SYSTEMS

Instruction	3 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• Students will understand the types of control systems, frequency domain specifications and state models. Learn to find the transfer function gain margin, phase margin and stability of control systems.	**At the end of the course students will be able to:** • Apply block diagram rules and mason's gain formula to calculate transfer function of control systems. • Apply root locus techniques. Bode plot and Nyquist plot to analyze the stability of control systems. • Apply properties of state transition matrix and analyze controllability and observability of digital control systems.

UNIT – I

Control System fundamentals and Components: Classification of control systems, Open and Closed loop systems, Error sensing devices – potentiometers and syncros. AC and DC servo motors. Mathematical modeling of mechanical systems and their conversion into electrical systems. Block diagram reduction and Signal flow graphs.

UNIT – II

Time response: Transfer function and Impulse response, types of input. Transient response of second order system for step input. Time domain specifications. Types of systems, static error coefficients, error series, Routh - Hurwitz criterion for stability.

Root locus techniques: Analysis of typical systems using root locus techniques. Effect of location of roots on system response.

UNIT – III

Frequency response plots: Bode plots, frequency domain specifications. Gain margin and Phase Margin. Principle of argument, Polar plot, Nyquist plot and Nyquist criterion for stability. Compensation: Cascade and feedback compensation using Bode plots. Phase lag, lead, lag-lead compensators. PID controller.

UNIT – IV

Discrete Control Analysis: Digital control, advantages and disadvantages, and digital control system architecture. The discrete transfer function. Sampled data system. Transfer function of sample data systems. Stability of Discrete data systems.

UNIT – V

State Space Representation: Concept of state and state variables. State models of linear time invariant systems, State transition matrix, Solution of state equations. Design of digital control systems using state-space concepts. Controllability and observability.

Suggested Reading:

1. Nagrath, I.J., and Gopal, M., "*Control System Engineering*," New Age Publishers, 5/e, 2009.
2. Ogata, K., "*Modern Control Engineering*," 5/e, PHI, 2010.
3. Benjamin C. Kuo, "*Automatic Control Systems*," 7/e, PHI, 2010.
4. Richard C. Dorf & Robart H. Bishop, "*Modern Control Systems*," 11/e, Pearson, 2008.
5. Gopal, Madan, "*Digital Control Engineering*," 1/e, New Age Publishers, 2008.

EC 3060

ELECTRONIC INSTRUMENTATION

Instruction	3 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• The students will be able to understand basic measurement concepts, concepts of electronic measurements, importance of signal generators and signal analyzers in measurements, relevance of digital instruments in measurements, the need for data acquisition systems, measurement techniques in biomedical field.	**At the end of the course students will be able to:** • Identify different characteristics of instruments and errors in measurements. • To use modern instruments for measurements. • Demonstrate working principle and usage of medical instruments. • Modeling of various applications in virtual instrumentation. • Analyze various voltmeters, CRO, spectrum analyzer.

UNIT – I

Accuracy, Precision, Resolution and Sensitivity. Errors and their types. Standards of measurement, classification of standards, IEEE standards, Elements of ISO 9001, Quality management standards.

UNIT – II

Transducers: classification, factors for selection of a transducer, transducers for measurement of velocity, acceleration, force, radio activity, Hot wire anemometer. Passive electrical transducers- Strain gauges and strain measurement, LVDT and displacement measurement, capacitive transducer and thickness measurement. Active electrical transducers: Piezo electric, photo conductive, photo voltaic and photo emissive transducers.

UNIT – III

Characteristics of sound, pressure, power and loudness measurement. Microphones and their types. Temperature measurement, resistance wire thermometers, semiconductor thermometers and thermocouples. Humidity measurement, resistive capacitive, aluminum oxide and crystal Hygrometer types.

UNIT – IV

Block diagram, specification and design considerations of different types of DVMs. Digital LCR meters, Spectrum analyzers. The lEEE488 or GPIB Interface and protocol.

Delayed time base oscilloscope, Digital storage oscilloscope, and mixed signal oscilloscope. Introduction to virtual instrumentation, SCADA. Data acquisition system block diagram

UNIT-V

Biomedical Instrumentation: Human physiological systems and related concepts. Bio-potential electrodes Bio-potential recorders - ECG, EEG, EMG, X- ray machines and CT scanners, magnetic resonance and imaging systems, Ultrasonic Imaging systems.

Suggested Reading:

1. Albert D. Helfric, and William D. Cooper, "*Modern Electronic Instrumentation and Measurement Techniques"*, PHI, 2010.
2. H S Kalsi, "*Electronic Instrumentation"*, 3/e, TMH, 2011.
3. Robert A Witte, "*Electronic Test Instruments: Analog and Digital Measurements"*, 2/e, 2002.
4. Nakra B.C, and Chaudhry K.K., "*Instrumentation, Measurement and Analysis"*, TMH, 2004
5. Khandpur. R.S.,"*Handbook of Bio-Medical Instrumentation"*, TMH, 2003.

EC 3070

FINISHING SCHOOL – III : TECHNICAL SKILLS

BASICS OF JAVA

Instruction	2 Periods per week	External Examination - Duration	1½ Hours
Sessionals	15 Marks	External Examination - Marks	35
Credits	01		

Course Objective:	Course Outcomes
• students will be able to create Java programs that leverage the object-oriented features of the Java language, use data types, arrays and other data collections; implement error-handling techniques using exception handling and develop technical skills necessary for a complete understanding of front-end web development	**At the end of the course students will be able to:** • Analyze the semantics of HTML, Java script. • Interpret the different parts of a web page. • Interpret the Java SDK environment to create, debug and run simple Java programs. • Apply fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc. • Demonstrate understanding of applets, events and keywords.

UNIT – I

HTML for Java Programmers: Introduction to Internet. HTML, HTML format, HTML tags, the applet tag, HTML Document Creation. Introduction to scripting languages VBScript and Java Script.

UNIT – II

Overview of Java, Features of Java, Java tools, Java applications, The Java language: Java keywords, Primitive types, Literals, Arrays, Operators, and Control Operations: Selection, Iteration, Jumping.

UNIT – III

Java Classes class inheritance

Exception handling, working with Threads: Thread basics, Thread classes, Creating Threads, scheduling and Thread Priorities, Daemons, Grouping threads, Thread states, Synchronization, Packages.

UNIT – IV

Java Applets, Programming the user interface: Introduction and Basic Concepts, Abstract Window Toolkit (AWT), Drawing, Interactive Interface Elements, Organizing Interface with Layouts, Images, Windows, Frames, Dialog Box, and File Dialog Box

UNIT – V

Applet method of interest, Extending the AWT, Extending Components, Event Handling: AWT Event handling, the Event class, java input events:

Suggested Reading:

1. Thomas. A. Powell, *HTML- The Complete Reference*, TMH, 2002.
2. Herbert Schildt, *JAVA – The Complete Reference*, TMH, 2014 9th edition.
3. Comer, *Internet Book – everything you need to know about computer networking & How Internet Works*, 4th PHI, 2015.

HS 3110

FINISHING SCHOOL – III : SOFT SKILLS

Instruction	2 Periods per week	External Examination - Duration	1½ Hours
Sessionals	15 Marks	External Examination - Marks	35
Credits	01		

Course Objective:	Course Outcomes
This is a foundation course and aims at enhancing employability skills in students. Students will be introduced to higher order thinking skills and problem solving on the following areas - Arithmetic ability, Numerical ability and General reasoning. Students will be trained to work systematically with speed and accuracy while problem solving. The three major areas covered in this course include 1. Numerical Ability 2. Arithmetic Ability 3. General reasoning	**At the end of the course students will be able to:** • Solve questions on the above mentioned areas using short cuts and smart methods • Understand the fundamentals concepts of Aptitude skills • Perform calculations with speed and accuracy

Mode of Delivery:

In-Person Classroom teaching complemented with PowerPoint presentations and Videos.

Measurement of Outcomes:

1. Through Class-room Participation.
2. Through Class-room tests and activities.
3. Evaluating performance of students through periodical tests.

The course is divided into 5 units

UNIT – I

QUANTITATIVE APTITUDE - NUMERICAL ABILITY

- Numerical Ability
  - Introduction to higher order thinking skills
  - Speed Maths
  - Number systems
  - LCM & HCF

UNIT – II

QUANTITATIVE APTITUDE- ARITHMETIC ABILITY FOUNDATION

- Arithmetic Ability
  - Percentage
  - Profit loss and discounts
  - Ratio proportions Allegations and mixtures
  - Averages

UNIT – III

QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED

- Arithmetic Ability
  - Time speed and distance
  - Time and work
  - Interest calculations

UNIT – IV

REASONING ABILITY – GENERAL REASONING PART 1

- General Reasoning
  - Coding decoding
  - Directions
  - Series completions

UNIT – V

REASONING ABILITY- GENERAL REASONING PART 2

- General Reasoning
  - Analogies
  - Classification
  - Alphabet test
  - Mathematical operations

EC 3311

INTEGRATED CIRCUITS LAB

Instruction	3 Periods per week	External Examination - Duration	3 Hours
Sessionals	25 Marks	External Examination - Marks	50 Marks
Credits	02		

Course Objective:	Course Outcomes
• Students will design and verify circuits using ICs for the given specifications.	**At the end of the course students will be able to:** • Implementing and Testing various OPAMP based circuits. • Design and verify the combinational and sequential circuits. • Examine the performance of various filters and 555 timer applications.

Lab Experiments:

PART – A

1. Measurement of parameters of Op-Amp. Voltage Follower, Inverting and Non Inverting Amplifiers, Level Translators using Op-Amp.
2. Arithmetic Circuits: Summer, Integrator Differentiator using Op-Amp.
3. Active filters: LP, HP and BP using Op-Amp.
4. Op-Amp Oscillators: Astable, Monostable.
5. Triangle and Square wave Generators. Schmitt Trigger using Op-Amp.
6. Voltage Controlled Oscillator Using LM 566.
7. IC Regulators and current boosting.
8. Applications of 555 Timer.

PART – B

1. Measurement of propagation delay, fan-out, Noise margin and transfer Characteristics of TTL and CMOS IC gates and open collector / drain gates.
2. Designing code converters using logic gates and standard code converters. Parity generator and checker circuit.
3. Flip-Flop conversions and latches using gates and ICs.
4. Designing Synchronous, Asynchronous up/down counters
5. Shift registers and ring counters using IC Flip-Flops & Standards IC counters.
6. Full adders, subtractors using logic gates and multiple bits IC Adder/Subtractor and arithmetic Circuits.
7. Mux - Demux applications.
8. Interfacing counters with 7-segment LED/LCD display units.

General Note:

1. At least 5 experiments from each part.
2. A total of not less than 10 experiments must be carried out during the semester.
3. Analysis and design of circuits, wherever possible, should be carried out using SPICE tools.

EC 3321

MICROPROCESSOR AND MICROCONTROLLER LAB

Instruction	3 Periods per week	External Examination - Duration	3 Hours
Sessionals	25 Marks	External Examination - Marks	50 Marks
Credits	02		

Course Objective:	Course Outcomes
• Students will experiment with 8086 assembly language programming on X86 kits and perform virtual design simulation on proteus 7.2 for 8051 microcontroller in embedded 'C' with (μ vision-4) IDE.	**At the end of the course students will be able to:** • Apply the knowledge of programming on the basic architectures of 8086 μP & 8051 μC. • Interface 8051 μC with various I/O peripherals using proteous software in keil microvision 4 IDE. • Design and model a mini project as per the required specifications.

PART – A

[Experiments on assembly language programming for 8086 μP using Assembler]

1. Execution of basic programs on 8086 microprocessor (8 bit and 16 bit arithmetic operations).
2. Programs using different addressing modes.
3. Single byte, multi byte binary and BCD addition and Subtraction.
4. Code conversions.
5. String Searching and Sorting
6. Generation of waveforms and gating applications using 8253/8254 timers.
7. Generation of waveforms using DAC interface.
8. Monitor utilities of 8086 kit for Keypad/displaying results.

PART – B

[Experiments on Embedded C programming for 8051 μC using Keil IDE]

1. LED toggle, Switch control logics in polling mode.
2. Timer and counter programming.
3. Square wave generation with variable duty cycle (PWM).
4. Interrupt programming
5. Serial communication using RS 232 UART protocols.
6. Interfacing for A/D applications.
7. Program to control stepper motor and DC motor.
8. LCD display interfacing (4-bit and 8-bit mode).
9. Keypad interfacing.

General Note:

1. At least 7 experiments from each part.
2. A total of not less than 14 experiments must be carried out during the semester.
3. Analysis and design of circuits, wherever possible should be carried out using SPICE tools.

Special Note:

1. Sessional marks are to be awarded as per the following breakup.
   i. 20 marks for the regular lab exercises and internal exam.
   ii. 5 marks for the mini project-cum-design exercise(s).

EC 3331

NETWORKING LAB

Instruction	3 Periods per week	External Examination - Duration	3 Hours
Sessionals	25 Marks	External Examination - Marks	50 Marks
Credits	02		

Course Objective:	Course Outcomes
• Provides comprehensive coverage of networking topics, from fundamentals to advanced applications and services, while providing opportunities for hands-on practical experience and career skills development.	**At the end of the course students will be able to:** • Build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes. • Configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPng, single-area and multi-area OSPF, virtual LANs, and inter-VLAN routing.

1. Packet Tracer - Network representation.
2. Configuring Initial Switch Settings.
3. Investigating the tcp/ip and osi models in action.
4. Explore a Network.
5. Identifying Network Devices and Cabling.
6. Connecting Wired and Wireless lan.
7. Configure Initial Router Settings.
8. Investigate Unicast, Broadcast and Multicast Traffic.
9. Configuring ipv4 & ipv6 Addressing.
10. Troubleshooting ipv4 and ipv6 Addressing.
11. Subnetting Scenario 1.
12. Subnetting Scenario 2.
13. Implementing a Subnetted ipv6 Addressing Scheme.
14. DNS and DHCP.
15. Configuring a Linksys Router.
16. Skills Integration Challenge- module 1.

VASAVI COLLEGE OF ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION

B.E. III/IV – II SEMESTER

S. No.	Code	Subject	Scheme of Instruction				Scheme of Examination			
			Periods per week				Duration in Hrs.	Maximum Marks		Credits
			L	T	D	P		Ext Exam	Sessio-nals	
THEORY										
1	EC 3160	Digital Communication	3	1	-	-	3	70	30	3
2	EC 3170	Digital Signal Processing	3	1	-	-	3	70	30	3
3	EC 3180	Antennas and Wave Propagation	3	1	-	-	3	70	30	3
4	EC 3190	Computer Organization and Architecture	3	1	-	-	3	70	30	3
5	HS 3120	Managerial Economics and Accountancy	3	1	-	-	3	70	30	3
6	HS 3140	Human Values and Professional Ethics-II	2	-	-	-	3	70	30	1
7	EC 3220	Finishing School – IV: Technical skills	2	-	-	-	1½	35	15	1
8	HS 3210	Finishing School – IV: Soft skills	2	-	-	-	1½	35	15	1
PRACTICALS										
9	EC 3411	Analog and Digital Communication Lab	-	-	-	3	3	50	25	2
10	EC 3421	Digital Signal Processing Lab	-	-	-	3	3	50	25	2
11	EC 3431	Mini Project	-	-	-	3	-	-	25	2
		Total	**21**	**5**	**-**	**9**		**590**	**285**	**24**
		Grand Total	**35**					**875**		

EC 3160

DIGITAL COMMUNICATION

Instruction	3+1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• Students will understand the fundamentals of digital communication system & learn various source and channel coding techniques and will appreciate different examples of digital modulation applications in real time & Spread Spectrum modulation.	**At the end of the course students will be able to:** • Understand /compare digital modulation techniques and their applications. • Assess entropy and efficiency of various channels. • Design block codes, convolution & cyclic codes. • Analyze spread spectrum modulation techniques their acquisition and tracking circuits.

UNIT – I

Elements of Digital Communication System, Comparison of Digital and Analog Communication Systems. Analog to Digital Conversion, Quantization and Encoding techniques, PCM. Companding in PCM systems: μ-law and A-law. Applications of PCM: PCM-TDM. Introduction to Linear Prediction Theory. Modulation and demodulation of DPCM and DM. Quantization noise and Slope overload error in DM. Modulation and demodulation of ADM. Comparison of PCM, DPCM, DM and ADM. SNR of PCM and DM. Vocoders.

UNIT – II

Uncertainty, Information and entropy. Source coding, Shannon – Fano algorithm and Huffman coding. Discrete memoryless channels, Probability relations in a channel, priori & posteriori entropies, cascaded channels, mutual information, Channel capacity, information rate and information capacity. Rate distortion.

UNIT – III:

Types of transmission errors, need for error control coding, Linear Block Codes (LBC): description of LBC, generation, Syndrome and error detection, minimum distance of a block code, error correcting and error detecting capabilities, Standard array and syndrome decoding, Hamming codes. Binary cyclic codes (BCC): description of cyclic codes, encoding, decoding and error correction of cyclic codes using shift registers, BCH codes. Convolution codes: description, encoding and decoding.

UNIT – IV:

Base band digital data transmission, error probability, matched filter, correlation receiver, coherent and non-coherent ASK, FSK, PSK, DPSK and QPSK, and error probability. Need for MSK, Modulation, Comparison of digital carrier modulation schemes. M-ary signaling schemes. Synchronization methods.

UNIT – V

Need for spreading a code, generation and characteristics of PN sequences. Direct Sequence Spread Spectrum and Frequency hopping spread spectrum systems and their applications. Acquisition schemes for spread spectrum receivers, Tracking of FH and DS signals.

Suggested Reading:

1. Simon Haykin, "*Communication Systems*," 4/e, Wiley India, 2011.
2. Herbert Taub, Donald L. Shilling & Goutam Saha, "*Principles of Communication Systems*," 3/e, TMH, 2008.
3. P. Ramakrishna Rao, "*Digital Communication*," 1/e, TMH, 2011.
4. A. Bruce Carlson and Paul B. Crilly, "*Communication Systems*," 5/e, 2011.
5. Sam Shanmugham.K., "*Digital and Analog Communication Systems*," Wiley, 1979.

EC 3170

DIGITAL SIGNAL PROCESSING

Instruction	3+1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• Students will apply FFT algorithms, discuss various design methods of FIR & IIR filters, describe the concepts of multirate signal processing and identify important features of TMS 320C 54XX DSP processors.	**At the end of the course students will be able to:** • Apply FFT for computation of DFT. • Design digital filters by various methods • Implement S/R conversions and describe DSP processors.

UNIT – I

Fast Fourier Transform : Overview of Discrete time Fourier Transform (DTFT), Discrete Fourier transform (DFT), – Efficient computation of DFT- Properties of DFT .
FFT algorithms –Radix-2 FFT algorithms – Decimation in Time – Decimation in Frequency algorithms - in place computation- bit reversal- Use of FFT algorithms in Linear Filtering and Correlation.

UNIT – II

Digital filters (FIR) Design: Amplitude and phase responses of FIR filters – Linear phase filters – Windowing techniques for design of Linear phase FIR filters – Rectangular, Bartlet, Hamming, Blackman, Kaiser – realization and finite word length effects.

UNIT – III

Digital filters (IIR) Design: Butterworth and Chebychev approximation- IIR digital filter design techniques- Impulse Invariant transformation - Bilinear transform techniques- Digital Butterworth- Chebychev filters,-comparisons between FIR and IIR filters. Digital filters structures.

UNIT – IV

Multirate Digital Signal Processing : Introduction -Decimation by a Factor D- 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 Rate Conversion by an Arbitrary factor- Application of Multirate Signal Processing.

UNIT – V

Introduction to DSP Processors: Difference between DSP and other microprocessors architectures- their comparison and need for ASP, RISC and CPU- General purpose DSP processors- TMS 320C 54XX processors, architecture, addressing modes-instruction set.

Suggested Reading:

1. Alan V. Oppenheim & Ronald W. Schafer, "*Digital Signal Processing*," PHI, 2/e, 2010.
2. John G. Proakis & Dimtris G. Manolakis, "*Digital Signal Processing Principles, Algorithms and Application*," PHI, 3/e, 2000.
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, 2002.

EC 3180

ANTENNAS AND WAVE PROPAGATION

Instruction	3+1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• Students will understand antenna fundamentals, working of antennas and different modes of wave propagation.	**At the end of the course students will be able to:** • Analyze the basic antennas parameters and antenna radiation. • Classify, analyze and design the antennas and isotropic antenna arrays. • Identify and explain different modes of propagation different regions of atmosphere at different frequencies.

UNIT – I

Principles of radiation, retarded potential and isotropic radiator, Basic antenna parameters: patterns, radiation intensity, far field, near field, Gain and directivity, Antenna Polarization, effective aperture, aperture efficiency. Point sources, Current distribution, infinitesimal dipole.

UNIT – II

Half-wave dipole, quarter wave monopole, Effect of earth on vertical patterns, Loop antenna, Far field pattern of circular loop with uniform current. Helical Antennas: Axial mode pattern, wideband characteristics, radiation efficiency, Q, Bandwidth, S/N ratio.

UNIT – III

Arrays of point sources, two element array with equal and unequal amplitudes, different phases. Linear array with uniform distribution, binomial array, principle of pattern multiplication. Broadside and End fire arrays, effect of inter element phase shift on beam scanning.

UNIT – IV

VHF,UHF turnstile antennas, Rhombic Antenna, Yagi - Uda Array, Log periodic Antenna, Horn, Parabolic Reflector, Lens antennas. Microstrip antennas: different types, advantages and disadvantages of Microstrip antennas (Working principle and characteristics only).

Antenna Measurements: Antenna Test Site, impedance, radiation pattern and gain measurement techniques, Antenna temperature.

UNIT – V

Ground wave propagation, Space and Surface waves, Tropospheric refraction and reflection, Duct propagation, Sky wave propagation, Regular and irregular variations in ionosphere. Friis transmission formula, Line of sight propagation.

Suggested Reading:

1. John D. Krauss, Ronald J. Marhefka & Ahmad S. Khan, "*Antennas and Wave Propagation,*" 4/e, TMH, 2010.
2. Constantine A. Balanis, "*Antenna Theory: Analysis and Design,*" 3/e, John Wiley, 2005.
3. Edward C. Jordan and Kenneth G. Balmain, "*Electromagnetic Waves and Radiating Systems,*" 2/e, PHI, 2001.
4. Chatterjee, R., "*Antenna Theory and Practice,*" New Age Publishers, 2008.

EC 3190

COMPUTER ORGANIZATION AND ARCHITECTURE

Instruction	3+1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• Students will be introduced to computer organization and architecture and understand the basic concepts of CPU, I/o organization & memory organization.	**At the end of the course students will be able to:** • Define and discuss various types of Data representation, digital arithmetic algorithms and instruction codes.

UNIT – I

Data representation and Computer arithmetic: Introduction to Computer Systems, Organization and architecture, evolution and computer generations; Fixed point representation of numbers, digital arithmetic algorithms for Addition, Subtraction, 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 Computer 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 microprogram 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 interface. 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, I/O channel.

UNIT – V

Memory organization: Memory hierarchy, Primary memory, Auxiliary memory, Associative memory, Cache memory: mapping functions, Virtual memory: address mapping using pages, Memory management.

Suggested Reading:

1. Morris Mano, M., "*Computer System Architecture*," 3/e, Pearson Education, 2005.
2. Hamacher, Vranesic, Zaky, "*Computer Organization*," 5/e, McGraw Hill, 2007.
3. William Stallings, "*Computer Organization and Architecture: Designing for performance*," 7/e, Pearson Education, 2006.
4. John P. Hayes, "*Computer Architecture and Organization*," 3/e, TMH, 1998.
5. Govindarajulu, B., "*Computer Architecture and Organization*," 2/e, TMH, 2010.

HS 3120

MANAGERIAL ECONOMICS AND ACCOUNTANCY

Instruction	3+1 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70 Marks
Credits	03		

Course Objective:	Course Outcomes
• To create an awareness about the significance of economics in day to day life and its impact of policies of organizations. • Helps in engineering the products according to the societal needs • Helps in leaning the investment decision making • To understand the economical ways of production and pricing the products based on the market structures • To analyse the performance of companies	**At the end of the course students will be able to:** • Make decisions in solving the economic problems of the organization • Make better sale of the product with customer centered products and services • Make economical production by identifying the optimum combination of inputs and price them appropriately for better profits • Understand the process of making long term investment decisions involving huge outlay • Analyse the past performance of the company and make decisions for future and will be competent to set up own enterprise.

UNIT – I

Meaning and Nature of Managerial Economics: Branches of economics – micro and macro, Managerial Economics – nature, scope, importance, relation with other sciences and its usefulness to Engineers, Fundamental Concepts of Managerial Economics - Scarcity, Marginalism, Equi-marginalism, opportunity costs, Discounting, Time Perspective, Risk and Uncertainty, Profits, Case study method.

UNIT - II

Consumer Behaviour: Demand – concept, Determinants, Law of demand, relationship between total revenue, marginal revenue and demand, Elasticity of Demand (Price, Income Cross-Elasticity and advertising elasticity); Demand forecasting, Law of Supply, concept of Equilibrium. (Theory questions and small numerical problems on measurement of arc and point elasticity can be asked).

UNIT - III

Theory of Production and Markets: Production Function, Law of Variable Proportion, Isoquants, Economies of Scale, Cost analysis - cost concepts, Cost-Output relationship,
Optimization of employment of inputs, Break-Even Analysis, market structures – types, Price-Output determination under Perfect Competition and Monopoly (theory and problems can be asked on breakeven point).

UNIT - IV

Capital Management: Significance, Introduction to capital budgeting, traditional methods and discounted cash flow methods, determination and estimation of working capital requirements, sources of capital, (Theory questions and numerical problems on estimating working capital requirements and evaluation of capital budgeting opportunities can be asked).

UNIT - V

Book-Keeping: Principles of Double entry system of Book keeping, Journal, Three column cash book and petty cash book, Bank reconciliation statement, Trial Balance, Preparation of Final Accounts with simple adjustments, Analysis and interpretation of Financial Statements through Ratios (liquidity, solvency and profitability ratios).
(theory questions and numerical problems on preparation of final accounts, cash book, petty cash book, bank reconciliation statement, calculation of some ratios and analysis).

Suggested Reading:

1. Mehta P.L., “Managerial Economics – Analysis, Problems and Cases”, Sulthan Chand & Son’s Educational publishers, 2011.
2. Maheswari S. N. “Introduction to Accountancy”, Vikas Publishing House, 2005.
3. Financial Management by Khan & Jain. Mc. Graw Hill Education
4. W. Chris lewis & Craig H Petersen “Managerial economics”.
5. Modern Accounting by A. Mukherjee & M.Hanif
6. Micro Economics by M. L.Seth.
7. Financial Accounting by Jain & Narang.
8. Panday I.M. “Financial Management” Vikas Publishing House, 2009.

HS 3140

HUMAN VALUES AND PROFESSIONAL ETHICS - II

Instruction	2 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70
Credits	01		

Course Objective:	Course Outcomes
The course will enable the students to :- • Get a holistic perspective of value- based education. • Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations. • Understand professionalism in harmony with self and society. • Develop ethical human conduct and professional competence. • Enrich their interactions with the world around, both professional and personal.	**At the end of the course students will be able to:** • Gain a world view of the self, the society and the profession. • Make informed decisions. • Start exploring themselves in relation to others and their work –constantly evolving into better human beings and professionals • Inculcate Human values into their profession. • Validate their aspirations through right understanding of human relationship and see the co-relation between the human values and prevailing problems. • Strike a balance between physical, mental, emotional and spiritual parts their being. • Obtain a holistic vision about value-based education and professional ethics.

The central theme of this course is to draw attention to the fact that a right understanding of oneself can bring about a better understanding of others and the environment one lives and works in.

EVALUATION PATTERN

1. It is recommended to be a compulsory audit course for the B.E 2/4 and B.E 3/4.
2. There will be a grade associated with this course. It will be mandatory to pass this course (satisfactory performance) before completion of the program.
3. There is no `carry-over' permitted in this course. In case of unsatisfactory performance, it has to be repeated.
4. The internal evaluation is to be based on regular interaction with the students in the practice sessions and the viva. In addition, there may be a term paper. The evaluation will depend upon the students' grasp, participation and indications of transformation in thinking, as well as, the effort to carry out the self-exploration.
5. The written examination is meant to basically test the clarity of understanding of the core message and its application to life situation.

MODE OF DELIVERY

Questionnaires
Case-studies
Home and classroom assignments
Research based tasks
Discussions
Skits/Role-plays
Quizzes
Observations and practice
Team tasks and individual tasks
Viva
Short Movies/documentaries

CONTENTS OF THE SYLLABUS FOR BE ¾

1. **Distinction between need and greed**-Exercising the wisdom to distinguish need from greed.
2. **Rights and Responsibilities**-Educating an individual about rights and responsibilities –Safeguards-Stimulants-Social Justice-The three catalysts for deciding rights and responsibilities.
3. **Imbibing and inculcating Civic Sense and Civic-Virtues**, The true meaning of Integrity -Honesty, Humility, Openness, Transparency, Dedication, Reliability, Confidentiality, accountability, Collegiality, Sympathy, Trustworthiness, Co-operation, Courage.
    a. The moral dilemma of the Modern world, Respect for Self, Others and Work.
    b. Respect for women at the workplace.
4. **Ideal self-Real self**- How to define the ideal-idealism at various levels- is it possible to reach idealism –Man as a pilgrim on a journey to idealism.
5. **Managing Failure**-Identifying causes for failure and learning lessons-Using failure to score success-Role of self-confidence and personal ethics in coping with failure.

• Anger/ Depression • Fear • Agitation • Failure • Lethargy • Dishonesty	• Cruelty • Jealousy • Desire • Cheating • Pride • Greed • Lying

6. **Stress Management**- Identifying sources and levels of stress –Tackling stress and its associated negativity- Positive aspect of coping with stress- Some techniques to manage stress.
7. **Developing Emotional Intelligence**
   Self-Awareness
   Handling Emotions
   Motivation
   Empathy
   Social skills

EVALUATION CAN BE BASED ON THE FOLLOWING LINES

- Situational Analysis (Group work) (Solving issues)
- Short open seminars (Communication and Analytical Skills)
- Short essays, questions or multiple choice on family, professional ,office etc(topic based)
- Case study /Record.

Bibliography

- B.L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
- A.N Tripathy, 2003 Human values, New Age International Publishers.
- EG Seebauer & Robert L. Berry,2000,Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.
- Mike Martin and Ronald Schinzinger "Ethics in Engineering "McGraw Hill
- Charles E Haris, Micheal J Rabins, " Engineering Ethics "Cengage Learning
- Caroline whitback < Ethics in Engineering Practice and Research, Cambridge University Press
- Georgs Reynolds, Ethics in Information Technology", Cengage Learning
- Charles D.Fleddermann, " Engineering Ethics", Pearson Education /Prentice Hall, New Jersey,2004 (Indian Reprint)

Relavant Websites, CD's and Documentaries

- Value Education website, Http://www.universalhumanvalues.info
- UPTU website, Http://www.uptu.ac.in
- story of stuff, Http://www.storyofstuff.com
- AlGore, As Inconvenient Truth, Paramount Classics ,USA
- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology-The Untold story
- Anand Gandhi, Right Here Right Now, Cyclewala production

EC 3220

FINISHING SCHOOL – IV : TECHNICAL SKILLS
APPLICATIONS OF JAVA

Instruction	2 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70
Credits	01		

Course Objective:	Course Outcomes
• To familiarize the students with advanced Java programming concepts, simple graphical user interfaces, examine case studies and have practice in developing small-scale programs ,which is done using Object Oriented Programming techniques to develop Java applications in a Windows based environment	**At the end of the course students will be able to:** • Write good java programs in GUI using SWING and handling different kinds of event on it including applying the concepts of multithreading. • Update and retrieve the data from the databases using SQL • Implements a data tier based on JDBC. • Analyze business tier and business logic based on EJB • Ability to implements a web tier using Java Servlets and JSP supporting Java Beans and RMI.

UNIT – I

Working with Databases: Introduction to SQL and Relational Databases, Using java with databases: Java and CGI calls, JDBC API, Server side database Access. IO streams, IO exceptions.

UNIT – II

Files - streams - byte streams, character streams, text input/output, binary input/output, random access file operations, File management using File class.

Connecting to Database - JDBC Type 1 to 4 drives, connecting to a database, querying a database and processing the results, updating data with JDBC.

UNIT – III

Package Java. net: Datagram Packet, Datagram socket, Inet Address, Server Socket, Socket, URL, and URL Connection.

UNIT – IV

Introduction to CGI, PERL, SERVELETS, RMI, SWINGS, CORBA, EJB, activeX.

Suggested Reading

1. Thomas. A. Powell, *HTML- The Complete Reference*, TMH, 2002.
2. Herbert Schildt, *JAVA – The Complete Reference*, TMH, 2014 9th edition
3. Robert Orfali and Donharkey, *Client Server Programming with JAVA and CORBA*, John Wiley, 2nd ed., 1998.
4. Comer, *Internet Book – everything you need to know about computer networking & How Internet Works*, 3rd PHI, 2002

HS 3210

FINISHING SCHOOL – IV : SOFT SKILLS

Instruction	2 Periods per week	External Examination - Duration	3 Hours
Sessionals	30 Marks	External Examination - Marks	70
Credits	01		

Course Objective:	Course Outcomes
This course aims at enhancing the employability skills. Students will be trained in higher order thinking skills including analytical skills, problem solving skills and critical & logical reasoning skills. Students will be trained to work systematically and develop logical and analytical thinking. Students will be trained in the following areas 1. Critical and Non verbal reasoning 2. Pure Maths 3. Verbal ability 4. Logical reasoning 5. Data Interpretation and Analysis	**At the end of the course students will be able to:** • Understand the fundamentals concepts of Aptitude and verbal skills • Solve questions using short cuts and smart methods • Perform calculations with speed and accuracy • Develop Analytical thinking and problem solving skills

Mode of Delivery:
In-Person Classroom teaching complemented with PowerPoint presentations and Videos.

Measurement of Outcomes:
1. Through Class-room Participation.
2. Through Class-room tests and activities.
3. Evaluating performance of students through periodical tests.

The course is divided into 5 units

UNIT 1 VERBAL ABILITY
- Finding errors
- Vocabulary
  - Synonyms
  - Antonyms
  - Idioms and Phrases
- Fill in the blanks and sentence Jumbles
- Reading comprehension

UNIT 2 LOGICAL REASONING
- Logical Reasoning
  - Assignments
  - Puzzles
  - Blood relations
  - Syllogisms

UNIT 3 CRITICAL AND NON VERBAL REASONING
- Critical Reasoning
- Non verbal reasoning
  - Figure series and completions

UNIT 4 QUANTITATIVE APTITUDE - PURE MATHS
- Pure maths
  - Algebra
  - Probability
  - Permutations and combinations

UNIT 5 DATA INTERPRETATION AND ANALYSIS
- Data Interpretation
  - Line graph
  - Pie chart
  - Bar Graph
  - Tabulations

EC 3411

ANALOG AND DIGITAL COMMUNICATION LAB

Instruction	3 Periods per week	External Examination - Duration	3 Hours
Sessionals	25 Marks	External Examination - Marks	50
Credits	02		

Course Objective:	Course Outcomes
• The objective of this course is to provide necessary skills to design, analyze and implement digital communication systems.	**At the end of the course students will be able to:** • Analyze modulation & demodulation of PCM, DPCM, DM, ADM. • Plot the modulated & demodulated waveforms of ASK, PSK, FSK, MSK. • Study the working of modem. • Measure attenuation, NA, losses of optical fibre cable.

(A) Experiments on Analog Communication

1. AM, FM generation and detection
2. Balanced Modulator
3. Pre emphasis and De-emphasis circuits
4. Radio Receiver Measurements: Sensitivity, Selectivity and Fidelity
5. Sampling and reconstruction
6. PAM, PWM, and PPM generation and detection
7. Time Division, Frequency Division Multiplexing and De-multiplexing
8. PLL Characteristics
9. Spectral Analysis of Video signals generated by TV demonstrator Kit and Pattern Generator using Spectrum analyzer
10. Mixer Characteristics

(B) Experiments on Digital Communication

1. PCM generation and detection
2. Error control coding
3. Data formats / channel encoding and decoding.
4. Linear Delta, Adaptive Delta Modulation and Demodulation.
5. ASK, FSK, BPSK & QPSK generation and Detection.
6. Minimum Shift Keying generation & detection
7. Optical Fibre measurements:
   Numerical aperture, Attenuation, E-O and O-E characteristics
8. Digital Fibre Optic Multiplexed Link
9. Modem characteristics.
10. Wavelength Division Multiplexing

Note:

1. Minimum of **5** from Part A and **5** from Part B is mandatory.

EC 3421

DIGITAL SIGNAL PROCESSING LAB

Instruction	3 Periods per week	External Examination - Duration	3 Hours
Sessionals	25 Marks	External Examination - Marks	50
Credits	02		

Course Objective:	Course Outcomes
• Students will develop MATLAB programs for operation of sequences, to design and obtain the frequency response of various digital filters and to implement techniques of multirate processing.	**At the end of the course students will be able to:** • Develop MATLAB files for the verification of system response and design various digital filters. • Verify the functionality of FFT algorithms, interpolation & Decimation. • Implementation of code using CCS on DSK for verification of system response and for designing digital filters.

(A) Experiments on DSK and CCS

1. Solutions of difference equations
2. Impulse Response
3. Linear Convolution.
4. Circular Convolution
5. Study of procedure to work in real- time.
6. Fast Fourier Transform Algorithms: (DIT, DIF)
7. Design of FIR (LP/HP) using windows, (a)Rectangular, (b)Triangular (c) Hamming window
8. Design of IIR (HP/LP) filters.

(B) Experiments on signal processing.

1. DFT and FFT algorithm
2. Linear Convolutions
3. Circular Convolutions
4. FIR filter design using different data windows
5. IIR filter design: Butter worth, chebysheve type 1 and 2 and Bilinear transformation Methods.
6. Interpolation and Decimation.

Note:

1. Minimum of **5** from Part A and **5** from Part B is mandatory.

2. For section 'B', MATLAB with different toolboxes like Signal Processing, Signal Processing block set, and SIMULINK/ MATHEMATICA/ any popular software can be used.

EC 3431

MINI PROJECT

Instruction	3 Periods per week	External Examination - Duration	-
Sessionals	25 Marks	External Examination - Marks	-
Credits	02		

Course Objective:	Course Outcomes
• To make the students realize the application value of what they have studied till then. • The students would be made to know the importance of sequential thinking that is needed to achieve a specified goal. • This is a prelude to take up a major project in their final year.	**At the end of the course students will be able to:** • Take up projects of good quality and application value • Acquire skills to apply their knowledge in a multi-dimensional environment to solve problems of interdisciplinary nature. • Take up projects of social relevance and investigate academic issues and challenges in their implementation.

The Students are required to carry out Mini Project one or more of the areas such as

- Linear and Digital Integrated Circuits,
- Analog and Digital Communication
- Microprocessor and Microcontrollers
- Control and Instrumentation
- Digital Signal Processing
- Antennas

Students are required to submit a report on the Mini Project at the end of the Semester.