JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

III B. Tech. – I Semester (E.I.E)

S. No.	Group	Subject	L	T	P	CP
01.	9A10501	Sensors and Signal Conditioning	4	0	0	4
02.	9A10502	Industrial Instrumentation	4	0	0	4
03.	9A10503	Electro Magnetic Theory	3	1	0	4
04.	9A10504	Linear & Digital IC Applications	3	1	0	4
05.	9A02503	Control Systems	3	1	0	4
06.	9A10505	Principles of Communications	4	0	0	4
07.	9A04506	Pulse & Digital Circuits Lab	0	0	3	2
08.	9A10507	Electronic Measurements Lab	0	0	3	2
		contact periods / week	21	03	06	
			Total/Week 30			
Total Credits (6 Theory + 2 Labs)						28

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

III B. Tech. – II Semester (E.I.E)

S. No.	Group	Subject	L	T	P	CP
01.	9A10601	Analytical Instrumentation	4	0	0	4
02.	9A04602	Microprocessors & Microcontrollers	4	0	0	4
03	9A04605	VLSI Design	4	0	0	4
04.	9A05406	Computer Organization	3	1	0	4
05.	9A04603	Digital Signal Processing	3	1	0	4
06.	9A10602	Process Control Instrumentation	4	0	0	4
07.	9A04505	Linear & Digital IC Applications Lab	0	0	3	2
08.	9AHS601	Advanced English Communication skills lab	0	0	3	2
		contact periods / week	22	02	6	
			Total/Week 30			
Total Credits (6 Theory + 2 Labs)						28

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics & Instrumentation Engineering
(9A10501) SENSORS AND SIGNAL CONDITIONING
(Common to EIE, E Con E)

B.Tech. III-I Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I

INTRODUCTION TO MEASUREMENT SYSTEMS: General concepts and terminology, measurement systems, sensor classification, general input-output configuration, methods of correction.

Performance characteristics**:** static characteristics of measurement systems, accuracy, precision, sensitivity, other characteristics: linearity, resolution, systematic errors, random errors, dynamic characteristics of measurement systems: zero-order, first-order, and second-order measurement systems and response.

UNIT II

RESISTIVE SENSORS: Potentiometers, strain gages and types, resistive temperature detectors (rtds), thermistors, magneto resistors, light-dependent resistors (ldrs).

UNIT III

SIGNAL CONDITIONING FOR RESISTIVE SENSORS: Measurement of resistance, voltage dividers, Wheatstone bridge. Balance and deflection measurements, sensor bridge calibration and compensation instrumentation amplifiers, interference types and reduction.

UNIT IV

REACTANCE VARIATION AND ELECTROMAGNETIC SENSORS: Capacitive sensors – variable & differential, inductive sensors - reluctance variation, eddy current, linear variable differential transformers (lvdts), variable transformers: synchros, resolvers, inductosyn, magneto elastic sensors, electromagnetic sensors - sensors based on faraday’s law, hall effect sensors.

UNIT V

SIGNAL CONDITIONING FOR REACTANCE VARIATION SENSORS: Problems and alternatives, ac bridges, carrier amplifiers - application to the lvdt, variable oscillators, resolverto-digital and digital-to-resolver converters.

UNIT VI

SELF-GENERATING SENSORS: Thermoelectric sensors, piezoelectric sensors, pyroelectric sensors, photovoltaic sensors, electrochemical sensors.

UNIT VII

SIGNAL CONDITIONING FOR SELF-GENERATING SENSORS: Chopper and low-drift amplifiers, offset and drifts amplifiers, electrometer amplifiers, charge amplifiers, noise in amplifiers.

UNIT VIII

DIGITAL SENSORS: Position encoders, variable frequency sensors - quartz digital thermometer, vibrating wire strain gages , vibrating cylinder sensors, saw sensors, digital flow meters, Sensors based on semiconductor junctions : thermometers based on semiconductor junctions, magneto diodes and magneto transistors, photodiodes and phototransistors, sensors based on mosfet transistors, charge-coupled sensors - types of ccd imaging sensors , ultrasonic-based sensors , fiber-optic sensors.

TEXT BOOK:

1. Sensors and Signal Conditioning: Ramon Pallás Areny, John G. Webster, 2nd edition, John Wiley and Sons, 2000.
2. Sensors and Transducers – D. Patranabis, TMH 2003.

REFERENCES:

1. Sensor Technology Handbook – Jon Wilson, 2004.
2. Instrument Transducers – An Introduction to Their Performance and Design – by Herman K.P. Neubrat, Oxford University Press.
3. Measurement System: Applications and Design – by E.O. Doeblin, McGraw Hill Publications.
4. Process Control Instrumentation Technology – D. Johnson, John Wiley and Sons.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A10502) INDUSTRIAL INSTRUMENTATION

B.Tech. III-I Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT – I
METROLOGY
Measurement of length – Plainness – Area – Diameter – Roughness – Angle – Comparators – Gauge blocks – Optical Methods of length and distance measurements.

UNIT – II
VELOCITY AND ACCELERATION MEASUREMENT
Relative velocity – Translational and Rotational velocity measurement – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods - Accelerometers of different types - Gyroscopes.

UNIT – III
FORCE AND TORQUE MEASUREMENT
Force measurement – Different methods –Torque measurement – Dynamometers- Gyroscopic Force and Torque Measurement – Vibrating wire Force transducer.

UNIT – IV
PRESSURE MEASUREMENT
Basics of Pressure measurement – Deadweight Gages and Manometers types – Force-Balance and Vibrating Cylinder Transducers – High and Low Pressure measurement – McLeod Gage, Knudsen Gage, Momentum Transfer Gages, Thermal Conductivity Gages, Ionization Gazes, Dual Gage Techniques.

UNIT – V
FLOW MEASUREMENT
Head type, Area type (Rota meter), electromagnetic type, Positive displacement type, mass flow meter, ultrasonic type, vertex shedding type, Hotwire anemometer type, Laser Doppler Velocity-meter.

UNIT – VI
TEMPERATURE MEASUREMENT
Temperature standards - fixed points -filled-system thermometers - Bimetallic thermometer-Thermocouple - Laws of thermocouple - Cold junction compensation- Measuring circuits - Speed of response -linearization - Resistance thermometer- 3 lead and 4 lead connections - thermistors - IC temperature sensors - Radiation pyrometer- Optical Pyrometer-Installation, maintenance and calibration of thermometers and thermocouples.

UNIT - VII
LEVEL MEASUREMENT
Visual techniques - Float operated devices - Displacer devices - Pressure gauge method - Diaphragm box-Air purge system-Differential pressure method – Hydro-step for boiler drum Level measurement - Electrical methods - Conductive sensors - capacitive sensors –Ultrasonic Method - Point level sensors-Solid level measurement.

UNIT – VIII
OTHER MEASUREMENTS
Nuclear Radiation Fundamentals, Radiation Detectors, Sound-Level Meter, Microphones, Time, Frequency, and Phase-Angle measurement, Liquid Level, Humidity, Chemical Composition, Particle Instruments and Clean-Room.

TEXT BOOKS:

1. Measurement Systems – Applications and Design – by Doeblin E.O., 4/e, McGraw Hill International, 1990.
2. Mechanical measurements by – A.K Shawney, Khanna publishers
3. Instrumentation by Rangan, Mani, sharma.

REFERENCES:

1. Process Instruments and Control Handbook – by Considine D.M., 4/e, McGraw Hill International, 1993.
2. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishers, 1986.
3. Instrument Technology, vol. I – by Jones E.B., Butterworths, 1981.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A10503) ELECTRO MAGNETIC THEORY

B.Tech. III-I Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

Review of Coordinate Systems, Vector Calculus:

UNIT I

ELECTROSTATICS: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Related Problems. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Related Problems.

UNIT II

MAGNETO STATICS: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Related Problems.

UNIT III

MAXWELL'S EQUATIONS (TIME VARYING FIELDS): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces, Related Problems.

UNIT IV

EM WAVE CHARACTERISTICS - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H. Sinusoidal Variations. Wave Propagtion in Lossless and Conducting Media. Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization. Related Problems.

UNIT V

EM WAVE CHARACTERISTICS – II: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance. Poynting Vector and Poynting Theorem – Applications, Power Loss in a Plane Conductor. Related Problems.

UNIT V

GUIDED WAVES: Parallel Plane Waveguides: Introduction, TE, TM, TEM Modes - Concepts and Analysis, Cut-off Frequencies, Velocities, Wavelengths, Wave Impedances. Attenuation Factor – Expression for TEM Case, Related Problems.

UNIT VII

INTRODUCTION TO EMI: Definition Of EMI and EMC, Classification, Natural and man-made EMI sources, Switching transients, Electrostatic Discharge, Nuclear Electromagnetic, Pulse and High Power Electromagnetics.

UNIT VIII

INTRODUCTION TO EMC: Grounding- Principles and practice of earthing, precautions in earthing, measurement of ground resistances, system grounding for EMC, cable shielding grounding. Shielding-Theory of effectiveness, materials, integrity at discontinuities, conductive coatings, cable shielding, effectiveness measurements, electrical bonding.

TEXT BOOKS:

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Principles and Techniques of electromagnetic compatability-Christos Christopoulos- 2/e-CRC Press (Taylor & Francis Group)-2007.
3. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

REFERENCES:

1. Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.
2. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
3. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed., 1999.
4. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi, 2001.
5. Electromagnetic Field Theory and Transmission Lines – G.S.N. Raju, Pearson Edn. Pte. Ltd., 2005.
6. Introduction to Electromagnetic Compatability- Clayton R.Paul – Jhon Wiley& Sons, 1992.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A10504) LINEAR & DIGITAL IC APPLICATIONS
(Common to E.I.E, E.Con.E, ECM)

B.Tech. III-I Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I
Differential Amplifier-Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input & Out put Off set voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT II
LINEAR & NON-LINEAR APPLICATIONS OF OP- AMPS: Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers. Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

UNIT III
TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK.

UNIT IV
CMOS LOGIC: Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families.

UNIT V
BIPOLAR LOGIC AND INTERFACING: Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series-ICs – Specifications.

UNIT VI
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 and simulation synthesis.

UNIT VII
COMBINATIONAL LOGIC DESIGN: Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers. VHDL modes for the above ICs.

UNIT VIII
SEQUENTIAL LOGIC DESIGN: Latches and flip-flops, PLDs, counters, shift register, and their VHDL models, synchronous design methodology, impediments to synchronous design.

TEXT BOOKS:

1. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 1987.
2. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005.
3. Digital System Design Using VHDL – Charles H. Roth Jr., Cengage Publications, 1st Edition.

REFERENCES:

1. Op amps & Linear Integrated Circuits Concepts & Applications, James M.Fiore Cengage 2009.
2. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2003.
3. VHDL Primer – J. Bhasker, Pearson Education/ PHI, 3rd Edition.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A02503) CONTROL SYSTEMS
(Common to EEE, ECE, E Con E, EIE)

B.Tech. III-I Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

Objective:
In this course it is aimed 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 and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

UNIT I
INTRODUCTION
Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems.

UNIT II
TRANSFER FUNCTION REPRESENTATION
Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver -Block diagram algebra –Signal flow graph - Reduction using Mason's gain formula.

UNIT III
TIME RESPONSE ANALYSIS
Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional, integral, derivative Controls.

UNIT IV
STABILITY ANALYSIS IN S-DOMAIN
The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability. The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT V
FREQUENCY RESPONSE ANALYSIS
Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT VI
STABILITY ANALYSIS IN FREQUENCY DOMAIN
Polar Plots-Nyquist Plots-Stability Analysis.

UNIT VII
CLASSICAL CONTROL DESIGN TECHNIQUES
Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, P, PD, PI, PID Controllers.

UNIT VIII

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties.

TEXT BOOKS:

1. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 5th edition, 2007.

REFERENCES:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 5th edition, 2010.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engg. by NISE 3rd Edition – John wiley.
4. "Modelling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A10505) PRINCIPLES OF COMMUNICATIONS
(Common to EIE, E Con E)

B.Tech. III-I Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I
INTRODUCTION: Block diagram of Electrical communication system, Radio communication: Types of communications, Analog, pulse and digital Types of signals, Fourier Transform for various signals, Fourier Spectrum, Power spectral density, Autocorrelation, correlation, convolution.

UNIT II
AMPLITUDE MODULATION: Need for modulation, Types of Amplitude modulation, AM, DSB SC, SSB SC, Power and BW requirements, generation of AM, DSB SC, SSB SC, Demodulation of AM: Diode detector, Product demodulation for DSB SC & SSB SC.

UNIT III
ANGLE MODULATION: Frequency & Phase modulations, advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM.

UNIT IV
PULSE MODULATIONS: Sampling, Nyquist rate of sampling, Sampling theorem for Band limited signals, PAM, regeneration of base band signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

UNIT V
DIGITAL COMMUNICATION: Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison.

UNIT VI
DIGITAL MODULATION: ASK, FSK, PSK, DPSK, QPSK demodulation, coherent and incoherent reception, Modems.

UNIT VII
INFORMATION THEORY: Concept of information, rate of information and entropy, Source coding for optimum rate of information, Coding efficiency, Shanon-Fano and Huffman coding.

UNIT VIII
ERROR CONTROL CODING: Introduction, Error detection and correction codes, block codes, convolution codes.

TEXT BOOKS:

1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communications – H. Taub and D. Schilling, TMH, 2003.

REFERENCES

1. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
2. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2nd Ed. 2004.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A04506) PULSE AND DIGITAL CIRCUITS LAB
(Common to ECE, E Con E, EIE)

B.Tech. III-I Sem. (E.I.E.)	**T**	**P**	**C**
	0	**3**	**2**

Minimum Twelve experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & Some applications.
6. Study of Flip-Flops & some applications.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.

Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A10507) ELECTRONIC MEASUREMENTS LAB
(Common to EIE, E Con E)

B.Tech. III-I Sem. (E.I.E.)	**T**	**P**	**C**
	0	**3**	**2**

List of Experiments :(Minimum 10 experiments should be conducted)

1. Conversion of D' Arsonval Galvanometer into DC meters (Current and voltage)
2. Conversion of D' Arsonval Galvanometer into AC meters (Current and voltage)
3. Conversion of D' Arsonval Galvano meter into Ohm meter.
4. Measurement of RLC and Q using Q-meter
5. Measurement of strain using strain gauge
6. Measurement of R, L and C using bridge circuits.
7. RTD – characteristics.
8. LVDT – characteristics.
9. Inductive and capacitive transducers.
10. Piezoelectric transducers.
11. Bourdon tube
12. Acceleration transducer.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A10601) ANALYTICAL INSTRUMENTATION

B.Tech. III-II Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT – I
pH AND CONDUCTIVITY & DISSOLVED COMPONENT ANALYSER
Conductivity meters – pH meters – Dissolved oxygen, hydrogen analyzers – Sodium analyzer – Silica analyzer and sampling systems.

UNIT – II
GAS ANALYSERS
Thermal conductivity types – CO monitor – NOX analyzer – H2S analyzer system and sampling – Industrial analyzer circuits, Theory and problems on Beer – Lamberts Law.

UNIT – III
CHROMATOGRAPHY - I
Gas chromatography – Liquid chromatography – their principles and applications.

UNIT – IV:
CHROMATOGRAPHY - II
Oxygen analyzer – paramagnetic type – detectors and sampling systems.

UNIT – V
SPECTROPHOTOMETERS - I
UV, VIS Spectrophotometers – Single beam and double beam instruments – Instrumentation associated with the above Spectrophotometers – Sources and detectors – Sources and detectors for IR Spectrophotometers.

UNIT – VI
SPECTROPHOTOMETERS - II
FT IR Spectrometer – Flame emission and atomic absorption Spectrophotometer – Atomic emission Spectrophotometer - sources for Flame Photometers and online calorific value measurements.

UNIT – VII
PRINCIPLE OF NUCLEAR MAGNETIC RESONANCE
Instrumentation associated with NMR Spectrophotometer – Introduction to mass spectrophotometers, Principle and brief discussion on ELECTRON SPIN RESONANCE (ESR).

UNIT – VIII
APPLICATIONS
Nuclear radiation detectors – Ionization chamber – GM Counter – Proportional Counter – Solid state detectors.

TEXT BOOKS:

1. Handbook of Analytical Instruments – by Khandpur. TMH.
2. Modern optical methods of analysis- by Eugene D. Olsen, McGRAW-HILL.

REFERENCES:

1. Instrumental Methods of Analysis – by Willard H.H., Merrit L.L., Dean J.A. and Seattle F.L., CBS Publishing and Distributors, 6/e, 1995.
2. Instrument Technology – by Jones B.E., Butterworth Scientific Publ., London, 1987.
3. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishing, New Delhi, 2/e, 1992.
4. Principles of Instrumental Analysis – by Skoog D.A. and West D.M., Holt Sounder Publication, Philadelphia, 1985.
5. Instrumental Analysis – by Mann C.K., Vickerks T.J. & Gullick W.H., Harper and Row Publishers, New York, 1974.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A04602) MICROPROCESSORS AND MICROCONTROLLERS
(Common to CSE, ECE, E Con E, EIE, EEE)

B.Tech. III-II Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT-I
INTRODUCTION
Architecture of 8086 microprocessor, special functions of general purpose registers.8086 flag register and function of 8086 flags, addressing modes of 8086,instruction set of 8086.assembler directives, simple programs, procedures and macros.

UNIT-II
ASSEMBLY LANGUAGE PROGRAMMING
Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-III
ARCHITECTURE OF 8086 & INTERFACING
Pin diagram of 8086-Minimum mode and maximum mode of operation, Timing diagram, memory interfacing to 8086(static RAM and EPROM).Need for DMA.DMA data transfer method. Interfacing with 8237/8257.

UNIT-IV
PROGRAMMABLE INTERFACING DEVICES
8255 PPI-various modes of operation and interfacing to 8086.interfacing keyboard, displays, 8279 stepper motor and actuators. D/A and A/D converter interfacing, Interrupt structure of 8086, Vector interrupt table. Interrupt service routines. Introduction to DOS and BIOS interrupts.8259 PIC architecture and interfacing cascading of interrupt controller and its importance.

UNIT-V
SERIAL DATA TRANSFER SCHEMES
Asynchronous and synchronous data transfer schemes.8251 USART architecture and interfacing.TTL to RS232C and RS232C to TTL conversion. Sample program of serial data transfer. Introduction to high-speed serial communications standards, USB.

UNIT-VI
PROGRAMMABLE INTERRUPT CONTROLLERS: PIC 8259, Programming with 8259, Programmable interval timer 8253, Modes of 8253, Programming examples with 8253.

UNIT-VII
8051 MICROCONTROLLER AND ITS PROGRAMMING:
Architecture of micro controller-8051 Microcontroller-internal and external memories-counters and timers-synchronous serial-cum asynchronous serial communication-interrupts. Addressing modes of 8051, Instructor set of 8051, Assembly Language Programming examples using 8051.

UNIT-VIII
ADVANCED MICROCONTROLLERS:
MCS – 96 Microcontrollers: Important Features, Pin Diagram, Internal Architecture, Memory Map, Addressing Modes, Instruction set. ARM Microcontrollers: ARM Core Architecture, Versions of ARM, Important Features.

TEXT BOOKS:

1. Advanced microprocessor and peripherals-A.K. Ray and K.M.Bhurchandi, TMH, 2000.
2. Microcontrollers-Deshmukh, Tata McGraw Hill Edition.
3. Microcontrollers Architecture, programming, interfacing and system Design-Raj kamal, Pearson Education, 2005.

REFERENCES:

1. Microprocessors Interfacing-Douglas V.Hall, 2007.
2. The 8088 and 8086 Microprocessors-PHI, 4th Edition, 2003.
3. Micro computer system 8066/8088 family Architecture, programming and Design-By Liu and GA Gibson, PHI, 2nd Ed.
4. 8051 Microcontroller-Internals, Instructions, Programming and Interfacing by Subrata Ghoshal, Pearson, 2010.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A04605) VLSI DESIGN
(Common to ECE, E Con E, EIE)

B.Tech. III-II Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT –I
INTRODUCTION
Introduction to IC technology-MOS,PMOS,NMOS,CMOS and BI-CMOS technologies-oxidation, lithiography, diffusion, Ion implantation, metallisation , Encapsulation, probe testing, integrated resistors and capacitors.

UNIT-II
BASIC ELECTRICAL PROPERTIES
Basic electrical properties of MOS and BI-CMOS circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold voltage, g_m, g_{ds}, figure of merit; pass transistor, NMOS inverter, various pull-ups, CMOS inverter analysis and design, BI-CMOS inverters.

UNIT-III
VLSI CIRCUIT DESIGN PROCESSES
VLSI design flow, MOS layers, stick diagrams, design rules and lay out, 2 m CMOS design rules for wires, contacts and transistors layout diagrams for NMOS and CMOS inverters and gates, scaling of MOS circuits, limitations of scaling.

UNIT-IV
GATE LEVEL DESIGN
Logic gates and other complex gates, switch logic, alternate gate circuits, basic circuit concepts, sheet resistance RS and its concept to MOS, area capacitance units, calculations-(Micro)-delays, driving large capacitive loads, wiring capacitances, fan-in and fan-out, choice of layers.

UNIT-V
SUB SYSTEM DESIGN
Sub system design, shifters, adders, ALUs, multipliers, parity generators, comparators, zero/one detectors, counters, high density memory elements.

UNIT-VI
SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN
PLAs, FPGAs, CPLDs, standard cells, programmable array logic, design approach.

UNIT-VII
VHDL SYNTHESIS
VHDL synthesis, circuit design flow, circuit synthesis, simulation, layout, design capture tools, design verification tools, test principles.

UNIT-VIII
CMOS TESTING
CMOS testing need for testing, test principles, design strategies for test, chip level test techniques, system-level test techniques, layout design for improved testability.

TEXT BOOKS:

1. Essentials of VLSI circuits and systems-kamran Eshraghian, Eshraghian Dougles and A.pucknell, PHI, 2005 Edition.
2. Principles of CMOS VLSI design-Weste and EShraghian, Pearson Education, 1999.

REFERENCES:

1. Chip design for sub micron VLSI: CMOS layout and simulation-John P. Uyemura, Thomson Learning.
2. Introduction to VLSI circuits and systems-John P.Uyemura, John Wiley, 2003.
3. Digital Integrated circuits-John M. Rabaey, PHI, EEE, 1997.
4. Modern VLSI design-Wayne wolf, Pearson Education, 3rd Edition, 1997.
5. VLSI technology-S.M.SZE, 2nd Edition, TMH, 2003.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A05406) COMPUTER ORGANIZATION
(Common to E Con E, EIE)

B.Tech. III-II Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I
BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers. Data Representation- Fixed Point Representation, Floating – Point Representation. Error Detection Codes.

UNIT II
REGISTER TRANSFER AND MICROOPERATIONS: Register Transfer Language. Register Transfer, Bus and Memory Transfers, Arithmetic Mircrooperatiaons, Logic Microoperations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers, Computer Instructions, Instruction Cycle. Memory: Reference Instructions- Input – Output and Interrupt, STACK Organization. Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT III
MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Microprogram Example, Design of Control Unit Hard Wired Control, Microprogrammed Control

UNIT IV
COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating – Point Arithmetic Operations, Decimal Arithmetic Unit Decimal Arithmetic Operations.

UNIT V
THE MEMORY SYSTEM: Basic concepts, semiconductor RAM memories, Read-only memories, Cache memories, performance considerations, Virtual memories, secondary storage, Introduction to RAID.

UNIT VI
INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Input – Output Processor (IOP), Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

UNIT VII
PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

UNIT VIII
MULTI PROCESSORS: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, InterProcessor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.

TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, 3rd Edition, Pearson/PHI.

REFERENCES:

1. Computer Organization and Architecture – William Stallings 6th Edition, Pearson/PHI.
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson.
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, 4th Edition, Elsevier.
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A04603) DIGITAL SIGNAL PROCESSING
(Common to ECE, E Con E, EIE, ECM)

B.Tech. III-II Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT-I
INTRODUCTION
Introduction to digital signal processing: discrete time signals and sequences, linear shift invariant systems, stability and causality, linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

UNIT-II
DISCRETE FOURIER SERIES
Properties of discrete Fourier series, DFS representation of periodic sequences, discrete Fourier transforms: properties of DFT, linear convolution of sequences using DFT, computation of DFT. Relation between Z-Transform and DFS.

UNIT-III
FAST FOURIER TRANSFORMS
Fast Fourier transforms (FFT)-Radix2 decimation in time and decimation in frequency FFT algorithms, inverse FFT and FFT for composite N.

UNIT-IV
REALIZATION OF DIGITAL FILTERS
Review of Z-transforms, applications of Z-Transforms, solution of difference equations of digital filters, block diagram representation of linear constant-coefficient difference equations, basic structures of IIR systems, transposed forms, basic structures of FIR systems, system function.

UNIT-V
IIR DIGITAL FILTERS
Analog filter approximations-Butterworth and chebyshev, design of IIR digital filters from analog filters, design examples: analog-digital transformations.

UNIT-VI
FIR DIGITAL FILTERS
Characteristics of FIR digital filters, frequency response. Design of FIR digital filters using window techniques, frequency sampling technique, comparison of IIR and FIR filters.

UNIT-VII
MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS:
Basic sample rate alteration devices, Multirate Structures for sampling rate Converters, Multistage design of decimator and Interpolator, Polyphase Decomposition, Nyquist filters.

UNIT-VIII
APPLICATIONS OF DIGITAL **SIGNAL PROCESSING:**
Spectral analysis of nonstationary Signals, Musical Sound processing, signal Compression, Transmultiplexers, Discrete Multitone Transmission of digital data.

TEXT BOOKS:

1. Digital signal processing, principles, Algorithms and applications: John G.Proakis, Dimitris G. Manolakis, Pearson Education/PHI, 2007.
2. Digital signal processing, A computer base approach- Sanjit K Mitra, Tata McGraw Hill 3rd Edn, 2009.
3. Discrete Time Signal Processing-A.V. Oppenheim and R.W. Schaffer, PHI.

REFERENCES:

1. Digital signal processing: Andreas Antoniou, TATA McGraw Hill, 2006.
2. A Text book on Digital Signal processing – R S Kaler, M Kulkarni,, Umesh Gupta, I K International Publisthing house Pvt.Ltd.
3. Digital signal processing: MH Hayes, Schaum's outlines, TATA McGraw Hill, 2007.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A10602) PROCESS CONTROL INSTRUMENTATION
(Common to EIE, E Con E)

B.Tech. III-II Sem. (E.I.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I
INTRODUCTION TO PROCESS CONTROL
Definition-Elements of process control-Process variables-degree of freedom- Characteristics of liquid system, gas system and thermal system- Mathematical model of liquid process, gas process, thermal process- Batch process and continuous process- Self regulation.

UNIT II
BASIC CONTROL ACTIONS
Characteristics of ON-OFF, proportional, integral, derivative control modes, composite control modes – PC, PI and PID modes- two position control- Single speed floating control – Ziegler Nichols method.

UNIT III
MEASURING ELEMENTS
Types of measuring means–Temperature elements-liquid level measurements – fluid flow measurements–pneumatic transmission-electric transmission–first order and second order response to measuring elements.

UNIT IV
CONTROLLING ELEMENTS
Self operated controllers –pneumatic proportional controllers (displacement and force type)-Air supply for pneumatic systems-Hydraulic controllers–Electrical proportional controllers-Electronic proportional controllers-Theory of automatic controllers circuits.

UNIT V
ADVANCED CONTROL TECHNIQUES
Ratio control systems – Dynamic compensatory-adding feedback-principle areas of feed forward control - Economic considerations. Properties of inner loop , External feedback –Tuning cascade controllers , Final Control Elements - Pneumatic actuators–Electro-pneumatic actuators–Hydraulic actuators –Electric motor actuators–Two position motor actuators –Sliding steam control valves-Rotating shaft control valves-control valve sizing. Applications of Process Control.

UNIT VI
ENERGY TRANSFER
Heat transfer-heat exchangers without phase change-Boiling liquids and condensing vapors-combustion control of fuel and air –fired heaters –steam plant control systems –drum level control-drum pressure control- steam temperature control.

UNIT VII
CHEMICAL REACTIONS AND CONVERSIONS
Principles of governing the conduct of reactions-chemical equilibrium-reaction rate- Stability of exothermic reactors – continuous reactors-apporting reactant flows temperature control-maximizing procedure- controlling conversion.

UNIT VIII
MASS TRANSFER OPERATIONS
Modeling the process- relative gain analysis-configuring the controls composition – Feedback pressure control methods – controlling at constraints – side steam columns material –balance

control –vapor compression – Evaporation barometric condensers – rate of drying inferential controls-optimum air flow - Nuclear power plant & Operations.

TEXT BOOKS:

1. Automatic Process Control- Donal.P.Eckman (Willeyn Eastern).
2. Process Control- Peter Harriot for units (T.M.H).

REFERENCES:

1. Process Control Systems –F.G Shirskey (Mc Graw Hill).
2. Instrument Engineering Hand Book- Liptak & Venezel (Chilton Randor).
3. Process system analysis and control by D.R Coughanowr, 2nd edition McGraw Hill.
4. Chemical Process control by G.Stephaonopolom, PHI Publications (1998).

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9A04505) LINEAR & DIGITAL IC APPLICATIONS LAB
(Common to E Con E, EIE)

B.Tech. III-II Sem. (E.I.E.)	**T**	**P**	**C**
	0	**3**	**2**

Minimum Twelve Experiments to be conducted:
Part A (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.

Part B (ECAD Lab):
Simulate the internal structure of the following Digital IC's using VHDL / VERILOG and verify the operations of the Digital IC's (Hardware) in the Laboratory

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.
9. Universal shift register -74X194.

Equipment required for Laboratories:

1. RPS
2. CRO
3. Function Generator
4. Multi Meters
5. IC Trainer Kits (Optional)
6. Bread Boards
7. Components: - IC741, IC555, IC566, 7805, 7809, 7912 and other essential components.
8. Analog IC Tester

For Software Simulation

1. Computer Systems
2. LAN Connections (Optional)
3. Operating Systems
4. VHDL/ VERILOG
5. FPGAS/CPLDS (Download Tools)

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Instrumentation Engineering
(9AHS601) ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
(Common to ECE, E Con E, ECM, EIE, EEE, ME, AE)

B.Tech. III-II Sem. (E.I.E.)	**T**	**P**	**C**
	0	**3**	**2**

1. Introduction

The Advanced English Language Skills Lab introduced at the 3rd year B.Tech level is considered essential for the student for focusing on his/her career. At this stage it is imperative for the student to start preparing for the ever growing competition in the job market. In this scenario, in order to be on par with the best, he/she needs to improve his/her Communication and soft skills

This course focuses on the practical aspects of English incorporating all the four (LRSW) skills relevant to the requirements of the prospective employers in view of globalization. The proposed course will enable the students to perform the following:

- Intensive reading to improve comprehension and communication
- Attentive listening for better understanding
- Write project/research/technical reports
- Write Resume' to attract attention
- Discuss ideas / opinions for better solutions
- Face interviews confidently
- Gather information, organize ideas, and present them effectively before an audience
- To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL,CAT, GMAT etc.

2. Objectives:

Keeping in mind the previous exposure of the student to English, this lab focuses on improving the student's proficiency in English at all levels. The lab intends t**o** train students to use language effectively, to participate in group discussions, to help them face interviews, and sharpen public speaking skills and enhance the confidence of the student by exposing him/her to various situations and contexts which he/she would face in his/her career

3 Syllabus

The following course content is prescribed for the Advanced Communication Skills Lab:

Reading Comprehension -- Reading for facts, guessing meanings from context, speed reading, scanning, skimming for building vocabulary(synonyms and antonyms, one word substitutes, prefixes and suffixes, idioms and phrases.)

Listening Comprehension-- Listening for understanding, so as to respond relevantly and appropriately to people of different backgrounds and dialects in various personal and professional situations.

Technical Report Writing—Types of formats and styles, subject matter, organization, clarity, coherence and style, data-collection, tools, analysis

Resume' Writing—Structure, format and style, planning, defining the career objective, projecting one's strengths, and skills, creative self marketing, cover letter

Group Discussion-- Communicating views and opinions, discussing, intervening. providing solutions on any given topic across a cross-section of individuals,(keeping an eye on

modulation of voice, clarity, body language, relevance, fluency and coherence) in personal and professional lives.

Interview Skills—Concept and process, pre-interview planning, mannerisms, body language, organizing, answering strategies, interview through tele and video-conferencing

Technical Presentations (Oral)— Collection of data, planning, preparation, type, style and format ,use of props, attracting audience, voice modulation, clarity, body language, asking queries.

4. Minimum Requirements

The English Language Lab shall have two parts:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.
The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a TV, A digital stereo-audio and video system, Camcorder etc

System Requirement (Hardware Component):
Computer network with LAN with a minimum of 60 multimedia systems with the following specifications:
P-IV Processor, Speed-2.8 GHz, RAM_512 MB minimum, Hard Disk-80 GB, Headphones

Prescribed Software: GLOBARENA

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. **Technical writing and professional communication, Huckin and Olsen** Tata Mc Graw-Hil 2009.
2. **Speaking about Science**, A Manual for Creating Clear Presentations **by Scott Morgan and Barrett Whitener, Cambridge University press, 2006**
3. **Books on** TOEFL/GRE/GMAT/CAT/ IELTS **by Barron's/DELTA/Cambridge University Press.**
4. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008
5. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
6. **The ACE of Soft Skills** by Gopal Ramesh and Mahadevan Ramesh, Pearson Education, 2010
7. **Cambridge English for Job-Hunting** by Colm Downes, Cambridge University Press, 2008
8. **Resume's and Interviews** by M.Ashraf Rizvi, Tata Mc Graw-Hill, 2008
9. **From Campus To Corporate** by KK Ramachandran and KK Karthick, Macmillan Publishers India Ltd, 2010
10. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
11. **Managing Soft Skills** by K R Lakshminarayan and T.Muruguvel, Sci-Tech Publications, 2010
12. **Business Communication** by John X Wang, CRC Press, Special Indian Edition,2008