

w.e.f. 2010-2011 academic year



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA  
KAKINADA-533003, Andhra Pradesh (India)

ELECTRONICS AND COMMUNICATION ENGINEERING

**COURSE STRUCTURE**

**I YEAR**

**I SEMESTER**

S. No.	Subject	T	P	Credits
1	English – I	3	-	2
2	Mathematics - I	3	-	2
3	Engineering Physics – I	3	-	2
4	Engineering Chemistry I	3	-	2
5	C Programming	3	-	2
6	Environmental Studies	3	-	2
7	Engineering Physics & Engineering Chemistry Laboratory -I	-	3	2
8	Engineering Workshop (Carpentry, Fitting, House wiring, )	-	3	2
9	C Programming Lab	-	3	2
10	English Proficiency Lab	-	3	2
	<b>Total</b>			<b>20</b>

**I YEAR**

**II SEMESTER**

S. No.	Subject	T	P	Credits
1	English – II	3	-	2
2	Mathematics – II	3	-	2
3	Engineering Physics – II	3	-	2
4	Engineering Chemistry-- II	3	-	2
5	Engineering Drawing	3	-	2
6	Mathematical Methods	3	-	2
7	Engineering Physics & Engineering Chemistry Laboratory -II	-	3	2
8	English - Communication Skills Lab	-	3	2
9	IT Workshop	-	3	2
	<b>Total</b>			<b>18</b>

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**COURSE STRUCTURE**

**II YEAR**

**I SEMESTER**

S. No.	Subject	T	P	Credits
1	Managerial Economics and Financial Analysis	4	-	4
2	Electronic Devices and Circuits	4	-	4
3	Probability Theory & Stochastic Processes	4	-	4
4	Network Analysis	4	-	4
5	Signals & Systems	4	-	4
6	Electrical Technology	4	-	4
7	EDC Lab	-	3	2
8	Networks & Electrical Technology Lab	-	3	2
9	English Communication Practice	-	2	1
10	Professional Ethics & Morals-I	2	-	-
<b>Total</b>				<b>29</b>

**II YEAR**

**II SEMESTER**

S. No.	Subject	T	P	Credits
1	Electronic Circuit Analysis	4	-	4
2	Control Systems	4	-	4
3	Pulse & Digital Circuits	4	-	4
4	Switching Theory & Logic Design	4	-	4
5	EM Waves and Transmission Lines	4	-	4
6	Analog Communications	4	-	4
7	Electronic Circuits & P D C Lab	-	3	2
8	Analog Communications Lab	-	3	2
9	English Communication Practice	-	2	1
10	Professional Ethics & Morals-II	2	-	-
<b>Total</b>				<b>29</b>

w.e.f. 2010-2011 academic year



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ELECTRONICS AND COMMUNICATION ENGINEERING

**COURSE STRUCTURE**

**III YEAR**

**I SEMESTER**

S. No.	Subject	T	P	Credits
1	Linear IC Applications	4	-	4
2	Computer Architecture & Organization	4	-	4
3	Digital IC Applications	4	-	4
4	Digital Communications	4	-	4
5	Antennas and Wave Propagation	4	-	4
6	Electronic Measurements and Instrumentation	4	-	4
7	Digital Communications Lab	-	3	2
8	IC Applications Lab	-	3	2
9	I P R & Patents - I	2	-	-
<b>Total</b>				<b>28</b>

**III YEAR**

**II SEMESTER**

S. No.	Subject	T	P	Credits
1	Computer Networks	4	-	4
2	Digital Signal Processing	4	-	4
3	VLSI Design	4	-	4
4	Microwave Engineering	4	-	4
5	Microprocessors and Microcontrollers	4	-	4
6	Management Science	4	-	4
7	Microprocessors and Microcontrollers Lab	-	3	2
8	Electronic Computer Aided Design Lab	-	3	2
9	I P R & Patents - II	2	-	-
<b>Total</b>				<b>28</b>

w.e.f. 2010-2011 academic year



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**COURSE STRUCTURE**

**IV YEAR**

**I SEMESTER**

S. No.	Subject	T	P	Credits
1	Optical Communication	4	-	4
2	Embedded Systems	4	-	4
3	Digital Image Processing	4	-	4
4	Radar Systems	4	-	4
5	<b>Open Elective</b>	4	-	4
6	<b>Elective – I</b> 1. Telecommunication Switching Systems 2. Analog IC Design 3. Object Oriented Programming	4	-	4
7	Digital Signal Processing Lab	-	3	2
8	Microwave and Optical Communications Lab	-	3	2
<b>Total</b>				<b>28</b>

**IV YEAR**

**II SEMESTER**

S. No.	Subject	T	P	Credits
1	Cellular and Mobile Communications	4	-	4
2	<b>Elective – II</b> 1. Network Security & Cryptography 2. Satellite Communications 3. Digital Control Systems	4	-	4
3	<b>Elective – III</b> 1. Operating Systems 2. Structured Digital Design 3. Wireless Sensor Networks	4	-	4
4	<b>Elective – IV</b> 1. Analytical Instrumentation 2. Real Time Operating Systems 3. TV Engineering	4	-	4
5	PROJECT			12
<b>Total</b>				<b>28</b>

**Open Electives:**

1. Bio Medical Engineering
2. Image Processing
3. Signals & Communication Systems



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### III Year B. Tech. Electronics and Communication Engineering – I Sem.

#### LINEAR IC APPLICATIONS

##### UNIT I

**INTEGRATED CIRCUITS** : Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

##### UNIT II

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 III

**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.

##### UNIT IV

**NON-LINEAR APPLICATIONS OF OP- AMPS:** Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

##### UNIT V

**ACTIVE FILTERS:** Introduction, Butter worth filters – 1st order, 2nd order LPF, HPF filters. Band pass, Band reject and All pass filters.

##### UNIT VI

**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 demodulators. Applications of VCO (566).

##### UNIT VII

**D to A & A to D CONVERTERS** : Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, Specifications AD 574 (12 bit ADC).

##### UNIT VIII

**ANALOG MULTIPLIERS AND MODULATORS** : Four Quadrant multiplier, balanced modulator, IC1496, Applications of analog switches and Multiplexers, Sample & Hold amplifiers.

##### TEXT BOOKS :

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2<sup>nd</sup>

- Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.

**REFERENCES :**

1. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.
2. OP AMPS and Linear Integrated Circuits concepts and Applications, James M Fiore, Cenage Learning India Ltd.
3. Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll, PHI, 6th Edition.
4. Operational Amplifiers – C.G. Clayton, Butterworth & Company Publ.Ltd./ Elsevier, 1971.
5. Operational Amplifiers & Linear ICs – David A Bell, Oxford Uni. Press, 3<sup>rd</sup> Edition
6. Linear Integrated Circuits – S Salivahana, VSK Bhaskaran TMH, 2008.

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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

### COMPUTER ARCHITECTURE & ORGANAGATION

#### Unit 1:

##### **Computer System:**

Computer components, computer function, interconnection structures, Bus interconnection, arithmetic and logic unit, integer representation, integer arithmetic, fixed point representation, floating point representation.

#### Unit 2:

##### **Central Processing Unit:**

**Instruction Sets: Characteristics and addressing modes** – Machine instruction characteristics, Types of operands and operators, addressing modes, instruction formats, Assembly language

**Process Structure and Functions** – Process organization, register organization, instruction cycle, instruction pipelining.

#### Unit 3:

##### **Control Unit and Micro Programmed Control:**

Micro operations, control of the processor, hardwired implementation, micro programmed control, micro instruction sequencing, micro instruction execution,

#### Unit 4:

##### **Computer Arithmetic:**

Addition and subtraction, multiplication algorithms, division algorithms, floating point arithmetic operations, decimal arithmetic unit, decimal arithmetic operations.

#### Unit 5:

##### **The Memory System:**

Memory Hierarchy, main memory, auxiliary memory, associative memory, cache memory and Cache organisation, virtual memory, memory management hardware.

#### Unit 6:

##### **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.

#### Unit 7:

##### **Parallel Organization:**

**Parallel Processing** – use of multiprocessors, symmetric multi processors, cache coherence and MESI protocol, multi-threading and chip multiprocessors, non-uniform memory access computers, vector computations.

#### Unit 8:

**Multiprocessors** – Characteristics of multiprocessors, interconnection structures, inter processor arbitration, inter process arbitration, interprocessor communication and synchronization.

**Text Books:**

1. Computer System Architecture, 3/e, M. Morris Mano, Pearson.
2. Computer Organization and Architecture, 8/e, William Stallings, Pearson.

**References:**

1. Computer Organization, 5/e, Hamacher, Vranesic, TMH.
2. Computer Organization and Architecture, V. Rajaraman, T. Radhakrishnan, PHI Learning.
2. Computer Organization and Design, Pal Choudary, PHI.

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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### III Year B. Tech. Electronics and Communication Engineering – I Sem.

#### DIGITAL IC APPLICATIONS

##### UNIT I

**CMOS LOGIC:** Introduction to logic families, CMOS logic, CMOS steady state electrical behaviour, CMOS dynamic electrical behaviour, CMOS logic families.

##### UNIT II

**BIPOLAR LOGIC AND INTERFACING:** Diode Logic, 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 III

**COMBINATIONAL LOGIC DESIGN-I:** Introduction, Design and Analysis procedures, Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, Design considerations of the above combinational logic circuits with relevant Digital ICs.

##### UNIT IV

**COMBINATIONAL LOGIC DESIGN-II:** Ripple Adder, Look Ahead Carry Generator, Binary Parallel Adder, n-Bit Parallel Subtractor, Binary Adder-Subtractor, ALUs, Combinational multipliers, Barrel Shifter, Simple Floating-Point Encoder, Cascading Comparators, Dual Priority Encoder, Design considerations of the above combinational logic circuits with relevant Digital ICs.

##### UNIT V

**SEQUENTIAL LOGIC DESIGN-I:** Introduction, The Basic Bistable Element, Latches, and flip-flops, Flip-Flop Conversions, SSI Latches and Flip-Flops, Counters, Design of Counters using Digital ICs, Counter applications, Synchronous design methodology, Impediments to synchronous design, Design considerations of the above sequential logic circuits with relevant Digital ICs.

##### UNIT VI

**SEQUENTIAL LOGIC DESIGN-II:** MSI Registers, Shift Registers, Modes of Operation of Shift Registers, Universal Shift Registers, MSI Shift Registers, Ring Counter, Johnson Counter, Basic sequential logic Design steps, Design of Modulus N Synchronous Counters, Design considerations of the above sequential logic circuits with relevant Digital ICs.

##### UNIT VII

**PROGRAMMABLE LOGIC DEVICES (PLDs):** Introduction, Programmable Read Only Memory, Programmable Logic Array, Programmable Array Logic Devices, Comparison between PROM, PLA and PAL. Design considerations of PLDs with relevant Digital ICs.

##### UNIT-VIII

**MEMORIES:** ROM: Internal structure, 2D-Decoding, Commercial ROM types, timing and applications,. Static RAM: Internal structure, SRAM timing, standard SRAMS, synchronous SRAMS, Dynamic RAM: Internal structure, timing, synchronous DRAMs, Familiarity with Component Data Sheets-Cypress CY6116, CY7C1006, Specifications.

**TEXT BOOKS:**

1. Digital Design Principles & Practices By John F. Wakerly, PHI Publications, Third Edition., 2005.
2. Digital IC Applications By Atul P. Godse and Deepali A. Godse, Technical Publications, Pune, 2005.

**REFERENCES :**

1. Digital Integrated Circuits-A Design Perspective By Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic, Pearson Education, 2005.
2. Introduction to Logic Design – Alan B. Marcovitz, TMH, 2nd Edition, 2005.
3. Digital Logic and Computer Design By Mano, Pearson Education.

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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### III Year B. Tech. Electronics and Communication Engineering – I Sem.

#### DIGITAL COMMUNICATIONS

##### UNIT I

**PULSE DIGITAL MODULATION** : Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM).

##### UNIT II

**DELTA MODULATION** : Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

##### UNIT III

**DIGITAL MODULATION TECHNIQUES** : Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

##### UNIT IV

**DATA TRANSMISSION** : Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK, QPSK.

##### UNIT V

**INFORMATION THEORY** : Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties,

##### UNIT VI

**SOURCE CODING** : Introductions, Advantages, Shannon's theorem, Shannon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

##### UNIT VII

**LINEAR BLOCK CODES** : Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

##### UNIT VIII

**CONVOLUTION CODES** : Introduction, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

##### TEXT BOOKS :

1. Digital communications - Simon Haykin, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, TMH, 2003

##### REFERENCES :

1. Digital and Analog Communication Systems - Sam Shanmugam, John Wiley, 2005.
2. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004.

3. Modern Analog and Digital Communication – B.P.Lathi, Oxford reprint, 3rd edition, 2004.

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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### III Year B. Tech. Electronics and Communication Engineering – I Sem.

#### ANTENNAS AND WAVE PROPAGATION

##### UNIT I

**ANTENNA FUNDAMENTALS** : Introduction, Radiation Mechanism – single wire, 2 wire, dipoles, Current Distribution on a thin wire antenna . Antenna Parameters] - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beamwidths, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Height. Related Problems.

##### UNIT II

**Thin Linear Wire Antennas:** Retarded Potentials, Radiation from Small Electric Dipole, Quarterwave Monopole and Halfwave Dipole – Current Distributions, Evaluation of Field Components, Power Radiated, Radiation Resistance, Beamwidths, Directivity, Effective Area and Effective Height. Natural current distributions, fields and patterns of Thin Linear Center-fed Antennas of different lengths, Radiation Resistance at a point which is not current maximum. Antenna Theorems – Applicability and Proofs for equivalence of directional characteristics, Loop Antennas: Small Loops - Field Components, Comparison of far fields of small loop and short dipole, Concept of short magnetic dipole,  $D$  and  $R_r$  relations for small loops.

##### UNIT III

**ANTENNA ARRAYS** : 2 element arrays – different cases, Principle of Pattern Multiplication,  $N$  element Uniform Linear Arrays – Broadside, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison; Concept of Scanning Arrays. Directivity Relations (no derivations). Related Problems. Binomial Arrays, Effects of Uniform and Non uniform Amplitude Distributions, Design Relations.

##### UNIT IV

**NON-RESONANT RADIATORS** : Introduction, Travelling wave radiators – basic concepts, Longwire antennas – field strength calculations and patterns, V-antennas, Rhombic Antennas and Design Relations, Broadband Antennas: Helical Antennas – Significance, Geometry, basic properties; Design considerations for monofilar helical antennas in Axial Mode and Normal Modes (Qualitative Treatment).

##### UNIT V

**VHF, UHF AND MICROWAVE ANTENNAS - I** : Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Reflector Antennas : Flat Sheet and Corner Reflectors. Paraboloidal Reflectors – Geometry, characteristics, types of feeds, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Off-set Feeds, Cassegrainian Feeds].

##### UNIT VI

**VHF, UHF AND MICROWAVE ANTENNAS - II** : Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry, Features, Dielectric Lenses and Zoning, Applications. Antenna Measurements – Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and 3-Antenna Methods).

##### UNIT VII

**WAVE PROPAGATION - I:** Concepts of Propagation – frequency ranges and types of propagations. Ground Wave Propagation–Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations. Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance – Calculations for flat and spherical earth cases, Optimum Frequency, LUHF, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption.

#### **UNIT VIII**

**WAVE PROPAGATION – II:** Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations. Space Wave Propagation – Mechanism, LOS and Radio Horizon. Tropospheric Wave Propagation – Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, M-curves and Duct Propagation, Tropospheric Scattering.

#### **TEXT BOOKS :**

1. Antennas for All Applications – John D. Kraus and Ronald J. Marhefka, TMHI, 3rd Edn., 2003.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

#### **REFERENCES :**

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 2nd ed., 2001.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill, SECOND EDITION, 1988.

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## **JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**

### **III Year B. Tech. Electronics and Communication Engineering – I Sem.**

#### **ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**

##### **UNIT I**

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics- speed of response, Fidelity, Lag and Dynamic error. DC Voltmeters- Multirange, Range extension/Solid state and differential voltmeters, AC voltmeters- multi range, range extension, shunt. Thermocouple type RF ammeter, Ohmmeters series type, shunt type, Multimeter for Voltage, Current and resistance measurements.

##### **UNIT II**

Signal Generator- fixed and variable, AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform.

##### **UNIT III**

Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers.

##### **UNIT IV**

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO, Measurement of amplitude and frequency.

##### **UNIT V**

Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator type, Frequency counter, Time and Period measurement.

##### **UNIT VI**

AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge. Measurement of capacitance - Schering Bridge. Wheat stone bridge. Wien Bridge, Errors and precautions in using bridges. Q-meter.

##### **UNIT VII**

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors.

##### **UNIT VIII**

Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement. Data acquisition systems.

##### **TEXTBOOKS :**

1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

**REFERENCES :**

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.
2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2<sup>nd</sup> Ed., 2004.

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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### III Year B. Tech. Electronics and Communication Engineering – I Sem.

#### DIGITAL COMMUNICATIONS LAB

1. Pulse Amplitude Modulation and demodulation.
2. Pulse Width Modulation and demodulation.
3. Pulse Position Modulation and demodulation.
4. Sampling Theorem – verification.
5. Time division multiplexing.
6. Pulse code modulation.
7. Differential pulse code modulation.
8. Delta modulation.
9. Frequency shift keying.
10. Phase shift keying .
11. Differential phase shift keying.
12. Companding

#### Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. RF Generators - 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Digital Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.

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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

### III Year B. Tech. Electronics and Communication Engineering – I Sem.

#### IC APPLICATIONS LAB

##### Minimum Twelve Experiments to be conducted :

1. Study of OP AMPs – IC 741, IC 555, IC 565, IC 566, IC 1496 – functioning, parameters and Specifications.
2. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
3. Integrator and Differentiator Circuits using IC 741.
4. Active Filter Applications – LPF, HPF (first order)
5. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
6. IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
7. Function Generator using OP AMPs.
8. IC 555 Timer – Monostable Operation Circuit.
9. IC 555 Timer – Astable Operation Circuit.
10. Schmitt Trigger Circuits – using IC 741 and IC 555.
11. IC 565 – PLL Applications.
12. IC 566 – VCO Applications.
13. Voltage Regulator using IC 723.
14. Three Terminal Voltage Regulators – 7805, 7809, 7912.
15. 4 bit DAC using OP AMP.

##### 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, IC565, IC1496, IC723, 7805, 7809, 7912 and other essential components.
8. Analog IC Tester

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**

**III Year B. Tech. Electronics and Communication Engineering – I Sem.**

**IPR & PATENTS – I**