DEPARTMENT OF B.SC ELECTRONICS

1	B.SC	CIRCUITE ANALYSIS
2	B.SC	ELECTRONIC DEVICES
3	B.SC	ANALOG CIRCUITS PRACTICALS
4	B.SC	LINEAR INTEGRATED CIRCUITS & BASICS OF COMMUNICATION
5	B.SC	DIGITAL ELECTRONICS & MICROPROCESSOR
6	B.SC	MICROCONTROLLER & APPLICATIONS
7	B.SC	DIGITAL COMMUNICATION

Dr A. Sheshachalam
PRINCIPAL
Principal
Vaagdevi Degree & P.G. College
Kishanpura, Hanamkonda

B.Sc. ELECTRONICS SYLLABUS
B.Sc. I YEAR Semester – I
DSC- Paper – I : Circuit Analysis

Total number of hours : 56
No of hours per week : 4
Credits : 4

UNIT - I

AC Fundamentals : The sine wave –average and RMS values – The J Operator – Polar and Rectangular forms of complex numbers – Phasor diagram-Complex impedance and admittance.

Kirchhoff's Current and Voltage Laws: Concept of Voltage and current sources-KVL and KCL- application to simple circuits (AC and DC) consisting of resistors and sources – Node voltage analysis and Mesh analysis.

UNIT-II

Network Theorems (DC and AC): Superposition Theorem ,Thevenin's Theorem, Norton's Theorem, Maximum power transfer Theorem, Reciprocity Theorem, Milliman's Theorem, Application to simple Networks.

UNIT-III

RC and RL Circuits : Transient Response of RL and RC Circuits with step input, Time constants. Frequency response of RC and RL circuits , Types of filters – Low pass filter and High pass filter- frequency response, passive differentiating circuit and passive integrating circuit.

UNIT-IV

Resonance : RLC Series and parallel resonance circuits –Resonant frequency –Q Factor- Bandwidth-Selectivity.

Cathode Ray Oscilloscope: Cathode Ray Tube (CRT) and its working, electron gun focusing, deflection sensitivity, florescent screen. Measurement of Time period, Frequency , Phase and amplitude.

Text Books:

1) Basic Electronics-Grob 10th edition(TMH)
2) Circuit Analysis-P.Gnanaswam pearson Education.
3) Circuit and Networks-A. Sudhakar & S. Pallri(TMH)
4) Pulse, digital & switching waveforms-Milliman &Taub.
5) Networks, Lines and Fields-John Ryder (PHI)
6) Network theory-Smarajit Ghosh(PHI)

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KAKATYA UNIVERSITY
WARANGAL-506 009 (A.P)

B.Sc. I Year, Semester – I : Electronics Practical

<mark>**Paper – I : Circuit Analysis Lab**</mark>

No. of hours per week : 3

1. Measurement of peak voltage, frequency using CRO.
2. Measurement of phase using CRO.
3. Thevenin's theorem and Norton's theorem – verification.
4. Maximum power transfer theorem – verification.
5. CR circuit – Frequency response - (Low pass and High pass).
6. CR and LR circuits – Differentiation and integration – tracing of waveforms.
7. LCR – Series resonance circuit – frequency response – Determination of f_o, Q and band width.
8. Simulation: i) verification of KVL and KCL.

             ii) study of network theorems.

             iii) study of frequency response (LR).

Note: Student has to perform minimum of <u>Six</u> experiments.

Reference Books:

1) Lab manual for Electronic Devices and Circuits – 4th Edition. By David A Bell – PHI
2) Basic Electronics – A Text Lab Manual –Zbar, Malvino, Miller.

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B.Sc. ELECTRONICS SYLLABUS
B.Sc. I YEAR
Semester - II
DSC- Paper –II : Electronic Devices

Total number of hours : 56
No of hours per week: 4
Credits :4

UNIT- I

PN Junction: Formation of PN junction, Depletion region, Junction capacitance, Diode equation (no derivation) Effect of temperature on reverse saturation current , V - I characteristics and simple applications of i) Junction diode, ii) Zener diode, iii) Tunnel diode and iv) Varactor diode.

UNIT-II

Bipolar Junction Transistor(BJT) : PNP and NPN transistors, current components in BJT, BJT static characteristics (Input and Output) , Early effect , CB , CC , CE configurations of transistor and bias conditions (cut off, active, and saturation regions), CE configuration as two port network, h – parameter model and its equivalent circuit. Determination of h – parameters from the characteristics. Load line analysis (AC and DC). Transistor Biasing – Fixed and self bias.

UNIT- III

Field Effect Transistor (FET): Construction and working of JFET, output and transfer characteristics of FET, Determination of FET parameters. Application of FET as Voltage variable resistor. Advantages of FET over BJT. **MOSFET** :: construction and working of enhancement and depletion modes , output and transfer characteristics Application of MOSFET as a switch .

Uni Junction Transistor (UJT): Construction and working of UJT and its Characteristics. Application of UJT as a relaxation oscillator.

UNIT- IV

Silicon Controlled Rectifier (SCR): Construction and working of SCR. Two transistor representation, Characteristics of SCR. Application of SCR for power control.

Photo electronic Devices: Construction and Characteristics of Light Dependent Resistor (LDR), Photo voltaic Cell, Photo diode, Photo transistor and Light Emitting Diode(LED).

Books Recommended:

1) Electronic Devices and circuits-Millman and Halkias,(TMH)
2) Principles of Electronics-V K.Mehta & Rohit Mehta
3) Electronic Devices and Circuits-Allen Molteished(PHI)
4) Basic Electronics and Linear Circuits-Bhargava U
5) Electronic Devices and Circuits-Y.N.Bapat
6) Electronic Devices and Circuits-Mithal.
7) Experiments in Electronics-S.V.Subramanyam.

B.Sc. I Year, Semester – II : Electronics Practical
Paper – II : Electronic Devices Lab

No. of hours per week: 3

1. To draw volt- ampere characteristics of Junction diode and determine the cut – in voltage, forward and reverse resistances.

2. Zener diode V – I Characteristics – Determination of Zener breakdown voltage.

3. Voltage regulator (line and load) using Zener diode.

4. BJT input and output characteristics (CE configuration) and determination of 'h' parameters.

5. FET – Characteristics and determination of FET parameters.

6. UJT characteristics – determination of intrinsic standoff ratio.

7. UJT as relaxation oscillator.

8 Characteristics of LDR/Photo diode/Photo transistor/Solar cell.

Note: Student has to perform minimum of <u>Six</u> experiments.

Reference Books:
1) Lab manual for Electronic Devices and Circuits – 4th Edition.   By David A Bell - PHI

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KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
Under Graduate Courses (Under CBCS 2019–2022)
B.Sc. ELECTRONICS II Year
SEMESTER – III

PAPER – III:: ANALOG CIRCUITS
(DSC-3: Compulsory)

Theory: **4 Hours/Week**   **Credits: 4**   **Marks: 100 (Internal: 20; External: 80)**

Practical: **3 Hours/Week**   **Credits: 1**   **Marks: 25**

UNIT – I

Rectifiers and filters: Rectifiers: Half-wave, full-wave and bridge rectifiers, Efficiency, Ripple factor, regulation, harmonic components in rectified output. **Filters:** Choke input (inductor) filter, Shunt capacitor filter, L-section and π-section filters.

UNIT – II

Regulated Power Supplies: Block diagram of regulated power supply, Series and shunt transistor regulated power supplies, three terminal IC regulators (78XX and 79XX), Principle and working of switch mode power supply (SMPS). UPS – Principle and working.

UNIT – III

Transistor amplifier: Classification of amplifiers (Based on type of coupling and frequency range), Hybrid π-model of a transistor, RC-coupled CE amplifier – frequency response, analysis.

Feedback in amplifiers: Positive and negative feedback, Effect of negative feedback on gain, bandwidth, noise, input and output impedances. Emitter follower, Darlington pair and its advantages.

UNIT – IV

Oscillators:: Barkhausen criterion for sustained oscillations, RC oscillators: RC phase shift and Wien's bridge oscillators and derivation for frequency oscillations, LC oscillators: Hartley and Colpits Oscillators, derivation for frequency oscillation.

Multivibrators: Astable, Monostable and Bistable multivibrators – Qualitative treatment only.

Suggested Books:

1. Electronic Devices and Circuits-Millman and Halkias (TMH)
2. Basic Electronics and linear circuits - Bhargava, Kulshreshta& Gupta TMH
3. A first course in Electronics-AA Khan and KK Dey-PHI
4. Electronic Devices and Circuit Theory-Robert L Boylestad & Louis Nashelsky
5. Pulse, Digital and Switching circuits - Milliman and Taub

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
Under Graduate Courses (Under CBCS 2019– 2022)
B.Sc. ELECTRONICS II Year
SEMESTER – III

PAPER – III:: ANALOG CIRCUITS PRACTICALS
(DSC-3: Compulsory)
Practical: **3 Hours/Week**   **Credits: 1**   **Marks: 25**

1. Study of Half-wave, full-wave and bridge rectifier and determination of ripple factor.

2. Series inductor, shunt capacitor, L-section and π-section filters: Determination of ripple factor using Full wave Rectifier.

3. Study of voltage regulator using ICs: 78XX & 79XX.

4. Colpitt's oscillator – determination of frequency.

5. RC Phase shift oscillator - determination of frequency

6. Astable multivibrator – determination of time period and duty cycle.

7. RC-coupled amplifier – Study of frequency response

8. **Simulation experiments ::**

   i)   Rectifiers

   ii)   RC-coupled amplifier

   iii)   Wein's bridge oscillator

   iv)   Colpitt's oscillator

   v)   RC phase shift oscillator

   vi)   Astable multivibrator

Note: Student has to perform minimum of six experiments

Suggested Books:

1) Lab manual for Electronic Devices and Circuits – David A Bell, 4th Edition, PHI
2) Basic Electronics – A Text Lab Manual – Zbar, Malvino, Miller.

SCHEME OF QUESTION PAPER

B.Sc. (Electronics)
Internal Assessment Examination
Semester: I/II/III/IV/V/VI
Paper:
(For DSC, DSE,)

Time: 90 Min]   **[Marks: 20**

Answer ALL questions. Each question carries equal marks (2 x 10 = 20)

1. From Unit 1
2. From Unit 1
3. From Unit 1
4. From Unit 1
5. From Unit 1
6. From Unit 2
7. From Unit 2
8. From Unit 2
9. From Unit 2
10. From Unit 2

Mrs. G. Manjula, Chairperson, BoS   (24th Aug., 2020)   Prof. B. Venkatram Reddy, HoD

<u>**SCHEME OF QUESTION PAPER**</u>

KAKATIYA UNIVERSITY, WARANGAL
B.Sc. (Electronic) I/II/III Year Examination
Semester: I/II/III/IV/V/VI
Paper:
(For DSC, DSE, GE & Paper in lieu of project)

Time: 3 Hours]   [Marks: 80

SECTION A: SHORT ANSWER QUESTIONS (8 X 4 = 32)

Answer Any EIGHT questions. Each question carries equal marks

1. From Unit 1
2. From Unit 1
3. From Unit 1 (Problem)
4. From Unit 2
5. From Unit 2
6. From Unit 2 (Problem)
7. From Unit 3
8. From Unit 3
9. From Unit 3 (Problem)
10. From Unit 4
11. From Unit 4
12. From Unit 4 (Problem)

SECTION B: ESSAY TYPE ANSWER QUESTIONS (4 X 12 = 48)

Answer Any FOUR questions. All questions carry equal marks

13. (a)   From Unit 1
    OR
    (b)   From Unit 1

14. (a)   From Unit 2
    OR
    (b)   From Unit 2

15. (a)   From Unit 3
    OR
    (b)   From Unit 3

16. (a)   From Unit 4
    OR
    (b)   From Unit 4

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
Under Graduate Courses (Under CBCS 2019– 2022)
B.Sc. ELECTRONICS II Year
SEMESTER – IV

LINEAR INTEGRATED CIRCUITS & BASICS OF COMMUNICATION
PAPER – IV:: (DSC-4: Compulsory)

Theory: 4 Hours/Week Credits: 4 Marks: 100 (Internal: 20; External: 80)
Practical: 3 Hours/Week Credits: 1 Marks: 25

UNIT – I

Operational Amplifiers (Op-Amp): Emitter Coupled Differential amplifier, Block diagram of Op-Amp, Characteristics of Op-Amp, Op-Amp Parameters: Input resistance, Output resistance, Common mode rejection ratio (CMMR), Slew rate, Offset voltages, Input bias current, Basic Op-Amp circuits: Inverting Op-Amp, Virtual ground, Non-inverting Op-Amp, Frequency response of Op-Amp, Op-Amp as: summing amplifier, subtractor, comparator, voltage follower, integrator and differentiator.

UNIT – II

Applications of Op-Amps: Logarithmic amplifier, Sine wave (Wien Bridge) generator and square wave (Astable) generator, Triangular wave generator, Monostable multivibrator, Solving of simple second order differential equations, Basic Op-Amp series regulator and shunt regulator, IC 555 Timer (Block diagram and its working), IC 555 as monostable and astable multivibrator.

UNIT – III

Modulation: Need for modulation- Types of modulation- Amplitude, Frequency and Phase modulation. **Amplitude modulation**: Analysis of Amplitude modulation, side bands, modulation index, AM modulator, Balanced modulator, Demodulation – diode detector.

UNIT – IV

Frequency modulation: Analysis of FM**.** Working of simple frequency modulator, detection of FM waves: FM Discriminator, Advantages of frequency modulation, AM and FM Transmitters and radio receivers (Block diagram approach), Introduction to PAM, PPM, PWM, PCM, Delta modulation.

Suggested Books:

1. Op amps and linear Integrated Circuits – Ramakant Gayakwad, PHI
2. Linear Integrated Circuits - Coughlin and Driscoll
3. Linear Integrated Circuits - D Roy Choudhury and Shail B Jain
4. Electronic Communication Systems-George Kennedy & Bernard Davis
5. Principles of Electronic Communication Systems-Louis E Freznel, TMH

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
Under Graduate Courses (Under CBCS 2019– 2022)
B.Sc. ELECTRONICS II Year
SEMESTER – IV

LINEAR INTEGRATED CIRCUITS & BASICS OF COMMUNICATION PRACTICALS
PAPER – IV:: (DSC-4: Compulsory)
Practical: **3 Hours/Week**   **Credits: 1   Marks: 25**

Using IC 741 Op-Amp and IC 555 Timer:

1. Op amp as inverting Amplifier- Determination of Gain (With AC and DC)
2. Op amp as non-inverting Amplifier- Determination of Gain (With AC and DC)
3. OP Amp as Summing amplifier and comparator (Zero crossing detector)
4. Astable multivibrator – determination of time period and duty cycle.
5. Monostable multivibrator- determination of gate width.
6. Integrator/ Differentiator – study of wave forms.
7. Astable multivibrator using IC 555
8. Monostable multivibrator using IC 555.
9. AM modulator and detector
10. FM modulator and detector

Simulation of all the above experiments:

1. Inverting and Non inverting amplifiers and comparator
2. Integrator/ Differentiator using op amp
3. Wein's bridge oscillator
4. Astable multivibrator using Op Amp
5. Astable multivibrator using IC 555

Note: Student has to perform minimum of six experiments

1) Lab manual for Electronic Devices and Circuits – 4th Edition.   By David A Bell – PHI
2) Basic Electronics – A Text Lab Manual –Zbar, Malvino, Miller.

<u>SCHEME OF QUESTION PAPER</u>

B.Sc. (Electronics)
Internal Assessment Examination - I
Semester: I/II/III/IV/V/VI
Paper:
(For DSC, DSE, GE & Paper in lieu of project)

Time: 90 Min]   **[Marks: 20**

Answer ALL questions. Each question carries equal marks (2 x 10 = 20)

1. From Unit 1
2. From Unit 1
3. From Unit 1
4. From Unit 1
5. From Unit 1
6. From Unit 2
7. From Unit 2
8. From Unit 2
9. From Unit 2
10. From Unit 2

SCHEME OF QUESTION PAPER

KAKATIYA UNIVERSITY, WARANGAL
B.Sc. (ELectronic) I/II/III Year Examination
Semester: I/II/III/IV/V/VI
Paper:
(For DSC, DSE, GE & Paper in lieu of project)

Time: 3 Hours]   **[Marks: 80**

SECTION A: SHORT ANSWER QUESTIONS (8 X 4 = 32)

Answer Any EIGHT questions. Each question carries equal marks

1. From Unit 1
2. From Unit 1
3. From Unit 1 (Problem)
4. From Unit 2
5. From Unit 2
6. From Unit 2 (Problem)
7. From Unit 3
8. From Unit 3
9. From Unit 3 (Problem)
10. From Unit 4
11. From Unit 4
12. From Unit 4 (Problem)

SECTION B: ESSAY TYPE ANSWER QUESTIONS (4 X 12 = 48)

Answer Any FOUR questions. All questions carry equal marks

13. (a)   From Unit 1
    OR
    (b)   From Unit 1

14. (a)   From Unit 2
    OR
    (b)   From Unit 2

15. (a)   From Unit 3
    OR
    (b)   From Unit 3

16. (a)   From Unit 4
    OR
    (b)   From Unit 4

B.Sc. (Electronics) - III Year
Semester – V
Paper – V: (A) Digital Electronics & Microprocessor
(DSE-1: Compulsory)

Total: 56 Hrs
(4 Hrs / week)

UNIT-I   (12 Hrs)
Number system and Logic gates: Conversion of binary, octal, decimal & hexadecimal number systems, Binary addition and subtraction (1's and 2's complement methods).
Logic gates- OR, AND, NOT, XOR, NAND, NOR gates and their truth tables, Design of basic gates using the universal gates: NAND and NOR gates, half adder, full adder and parallel adder logic circuits. Logic families and their characteristics: TTL, CMOS and ECL logic circuits.

UNIT-II (12 Hrs)
Boolean algebra and Combinational logic circuits: Boolean algebra - Laws and identities, De Morgan's Theorems, Simplification of Boolean expressions using Boolean identities, Reduction of Boolean expressions using Karnaugh Maps, Sum of Products (SOP) representation (up to four variables), Multiplexer, De-Multiplexer, Decoder (3 to 8) and Encoder (8 to 3).

UNIT-III (16 Hrs)
Sequential logic circuits: Flip-flops: SR, D, JK, T, JK and JK Master-Slave, **Registers:** Shift registers, SISO, SIPO, PISO and PIPO registers, Universal shift register (IC 7496) Shift register **counters-** Ring counter, Johnson Counter-bit Asynchronous (Ripple) counter, Modulo-N counter, Synchronous counter, Up/Down Counters - ripple counter IC 7493 - Decade counter IC 7490 - working, Truth-table and timing diagrams.
Semiconductor memories: Organization and working of ROM, types of ROM's - PROM, EPROM, EEPROM, FLASH, RAM- static and dynamic **Semiconductor memories** :: Organization and working of ROM, types of ROM's - PROM, EPROM, EEPROM, FLASH, RAM- static and dynamic

UNIT-IV (16 Hrs)
Introduction to 8085 Microprocessor & its architecture:: Introduction to Microcomputer, Intel 8085 Microprocessor – Architecture of 8085 microprocessor – CPU – Timing & Control Unit – Instruction cycle, Fetch Cycle , Execute cycle (Timing diagram), Machine cycle and clock states. Interrupts – Hardware and Software, Address space partitioning – Memory mapped I/O & I/O mapped I/O.
Instruction set of 8085 microprocessor: Classification - Data transfer operations, Arithmetic operations, logical operations, Branch control operations and stack, I/O and Machine control operations. Stack and Subroutines, Addressing modes
Programming of 8085 microprocessor: Assembly language programming, addition (8 and 16 bit), 8 bit - subtraction, multiplication and division. Finding the largest and smallest number in data array
Suggested Books:
1. Digital Principles and Applications – Malvino & Leach - TMH.
2. Digital Principles and Applications - Ronald J.Tocci – Pearson Education.
3. Text book of Electronics BSc III year (Vol.III) - Telugu Akademi
5. Fundamentals of Digital Circuits – Anand Kumar – PHI
6. Digital Electronics Principles and Integrated circuits – Maini – Wiley India.
7. Digital Electronics – Gothman
8. Microprocessor Architecture and Programming – Ramesh S.Goanker – Penram.
9. Fundamentals of Microprocessors and Micro controllers – B.Ram, - Dhanpat rai & sons.
10. Introduction to Microprocessor – Aditya P.Mathur – TMH.

B.Sc. (Electronics) - III Year
Semester – V
Paper – V: (A) Digital Electronics & Microprocessor Practical's
(DSE-1: Compulsory)

1. Verification of truth tables of AND, OR, NOT, NAND, NOR, XOR Gates using IC 74XX series.
2. Construction of basic gates using NAND and NOR gates.
3. Construction of Half Adder using gates. Verification of truth table.
4. Construction of Full Adder using gates and verification of truth table.
5. Verification of truth tables of flip flops: RS, D, and JK using IC's.
6. Binary addition (8 bit and 16 bit) and subtraction (8 bit).
7. Decimal Addition (DAA).
8. Multiplication and Division (8 bit).
9. Picking of largest/Smallest number from the given data.
10. Arranging the given data in ascending/descending order.
11. Time Delay generation.

Simulation experiments:

1. 4 bit parallel adder using Full adders.
2. Decade counter using JK flip flops.
3. Up/Down counters using JK flip flops.
4. Multiplexer/De-Multiplexer.
5. Encoder.

Note: Student has to perform minimum of eight experiments

1. Lab manual for Electronic Devices and Circuits – David A Bell, 4th Edition – PHI
2. Basic Electronics – A Text Lab Manual – Zbar, Malvino, Miller.

B.Sc. (Electronics) - III Year
Semester – V
Paper – V: (B) Electronic Instrumentation
(DSE-1: Compulsory)

Total: 56 Hrs
(4 Hrs / week)

UNIT-I (14 Hrs)
Characteristics of an Instrument: Fundamental Elements of a measurement system- Static characteristics- Accuracy, precession, bias. Linearity, threshold, resolution, hysteresis, dead space, scale readability, span, static stiffness, input impedance, repeatability and reproductability- Errors and calculation of errors in overall system- dynamic characteristics-Zero, First and second order instrument-Responses for step, impulse, ramp and sinusoidal inputs, Classification of standards, IEEE standards of ISO9001, Quality of Management standards.

UNIT-II (16 Hrs)
Transducers and Sensors: Transducers, Factors for selection of Transducers, Definition of Transducer and sensor- Classification of transducers- Pressure (strain gauge, piezoelectric transducer), Displacement (potentiometric, LVDT) Ultrasonic Transducers (Ultrasonic Sensor).
Microphones: Microphones and their types, Temperature measurement, resistance wire thermometers, semiconductor thermo meters, and thermo couples, temperature (thermistor) and photosensitive (Vaccume and gas filled tubes, photocvonductivecells, photovoltaic cells, photoemmissive) Transducers. Flow transducers-flow meter, force transducer-Dynamometer, Acceleration Transducer-accelerometer, Applications of transducers.

UNIT-III (12 Hrs)
Bridge Measurements: Introduction- Wheatstone bridge, Kelvin Bridge, Guarded Wheatstone bridge, AC bridges and their applications: Maxwell bridge, Haybriodge, Schering bridge, Wien bridge.

UNIT-IV (14 Hrs)
Testing and Measuring Instruments: Oscilloscope, Block diagram, CRT circuits, Vertical and Horizontal Deflection Systems, Delay line, multiple trace, Probe, Special Oscilloscopes.
Measuring Instruments: DC Voltmeters, DC Current meters, AC Voltmeters and AC current meters, Ohmmeters, Multimeters, Meter protection, Extension of range, True RMS Responding Voltmeters, specifications of Instruments.

Suggested Books:
1. Instrumentation Devices and systems, CS Rangan., GR sharma and VSV mani, 1999 TataMcgrawh Hill, New Delhi.
2. Modern Electronics Instrumentation and Measurement techniques, A.D. Helfrick and W.D.Cooper, 1992 PHI New Delhi
3. A Course in Electrical and Electronic Measurement anmd Instrumentation, A.K. Sawhney, Dhanpat Ray and sons.
4. Measurement System applications and Design, E.O. Doebelin, 1983 International Edition, 3rd Edition McGraHills NY
5. Transducers and Instrumentation, DVS Murthy,1995 PHI New Delhi
6. Instrumentation for measurements, JW Dalley, WF Riley and KG McConnel,1993 Wiley NY
7. Instrumentation Measurements and Analysis, BC Nakre and KK Chaudhary, TMC NewDelhi
8. Principles of Instrumental Analysis, DA Skoog, 3rd Ed, Saunders College Publishing.

B.Sc. (Electronics) - III Year
Semester – V
Paper – V: (B) Electronic Instrumentation Practical's
(DSE-1: Compulsory)

1. Temperature transducer (Thermocouple/ Thermistor)

2. Pressure Transducer- Strain gauge

3. Displacement Transducer- LVDT (Linear Variable Differential Transformer)

4. Ultrasonic Transducer - Ultrasonic Sensor

5. Flow Transducer- Flow meter

6. Force Transducer- Dynamometer

7. Acceleration Transducer- Accelerometer

8. Photovoltaic cell (Solar cell)

9. Passive Transducers- Photocells (LDR)

10. CRO Characteristics

11. DC Voltmeter/ DC Current Meter

12. AC Voltmeter /AC current Meter

13. Multimeter

B.Sc. (Electronics) - III Year
Semester – VI
Paper – VI: (A) Microcontroller & Applications
(DSE-2: Compulsory)

Total: 56 Hrs
(4 Hrs / week)

UNIT-I (14 Hrs)
Microcontroller 8051: Overview and block diagram of 8051, Architecture and pin diagram of 8051, Data types and directives, Memory Organization, Register banks and Stack Pointer, PSW Register, other special function registers, I/O port organization, Interrupts and Timer/Counter modules.

UNIT-II (14 Hrs)
Instruction set of 8051 microcontroller: Classification: Data transfer, Arithmetic, logical, Single Bit, Jump, Loop and CALL instructions and their usage, Addressing modes: Immediate, Register, Direct, Indirect, Absolute addressing, Relative addressing, Indexed Addressing, and accessing memory using various addressing modes.

UNIT-III (14 Hrs)
Programming examples of microcontroller 8051: Addition, Subtraction, division, picking the smallest/largest number among a given set of numbers, arranging a given a set of numbers in ascending/descending order, Subroutines, I/O Programming, Bit manipulation, Accessing a specified port terminal and generating wave forms, Timer/Counter Programming in 8051, Programming 8051 timers- basic registers of timers: Timer 0, Timer 1 registers, TMOD register, TCON register, Timer modes – Mode 1, Mode 2 programming, Counter mode programming, Program to generate time delay.

Unit – IV (14 Hrs)
Serial communications: Serial communication, Types, modes and protocols, Data transfer rates, serial communication program- SBUF and SCON registers, RS232 standards, Programming timer Interrupts, Applications of Micro controller: Displaying information on a LCD, Interfacing a keyboard, Interfacing a temperature sensor, Interfacing of DAC 0808 to microcontroller, Interfacing of ADC 0804 to microcontroller, Seven segment LED.

Suggested Books:

1) The 8051 Microcontrollers and Embedded Systems – Muhammad Ali Mazidi and Janice Gillipsie Mazidi – Pearson Education Asia, 4th Reprint, 2002.
2) Text book of Electonics Bsc III year (vol.III)- Telugu Akademi.
3) Fundamentals of Microprocessors and Microcontrollers – B. Ram.
4) The 8051 Microcontroller – Architecture, programming and applications, Kennth J. Ayala, Penram International Publishing, 1995.
5) Micro controllers-Theory and Applications- Ajay V. Deshmukh.
6) Micro-controller 8051, D. Karuna Sagar, Narosa B

B.Sc. (Electronics) - III Year
Semester – VI
Paper – VI: (A) Microcontroller & Applications Practical's
(DSE-2: Compulsory)

Experiments using 8051 microcontroller:
1. Multiplication of two numbers using MUL command (later using counter method for repeated addition).
2. Division of two numbers using DIV command (later using counter method for repeated subtraction).
3. Pick out the largest/smallest number among a given set of numbers.
4. Arrange the given numbers in ascending/descending order.
5. Generate a specific time delay using timer/counter.
6. Interface ADC and a temperature sensor to measure temperature.
7. Interface DAC and generate a staircase wave form with a step duration and number of steps as variables.
8. Flash a LED connected at a specified out port terminal.
9. Interface stepper motor to rotate clock wise / anti clock wise through a given angle steps.

Experiments with Keil Software:
1. Write a program to pick out largest/smallest number among a given set of number.
2. Write a program to arrange a given set of numbers in ascending/descending order.
3. Write a program to generate a rectangular/square wave form at specified port.
4. Write a program to generate a time delay using timer registers.

Note: Student has to perform minimum of Six Experiments

B.Sc. (Electronics) - III Year
Semester – VI
Paper – VI: (B) Digital communication
(DSE-2: Compulsory)

Total: 56 Hrs
(4 Hrs / week)

Unit -I: (14 Hrs)
Introduction: Need and Necessity of Digitalization, Advantages of Digital Communication, Elements of digital communication
Signal Analysis: Complex Fourier sprectum, Fourier Transform, Properties of Fourier transform, Random signal and noise, Correlation and Power spectrum.
Information Theory: Introduction, Information Entropy, Properties of Entropy, Information rate, Types of information sources, Channels, joint Entropy. Conditional entropy, Redundancy, mutual information, channel capacity.

Unit- II: (14 Hrs)
Digital Communication System: Pulse Modulation: PAM, PWM, PPM, PCM, delta modulation, adaptive delta modulation, quantization and noise consideration. Digital Transmission and Reception: Timing, base band systems, ASK, FSK, PSK, QAM.

Unit - III: (14 Hrs)
Error detection and coding: Introduction,, parity check, cyclic redundancy check (CRC), Hamming distance, Hamming codes, Cyclic codes, line synchronization codes, Manchester code, Non-Return to Zero (NRZ) coding, Walsh codes

Unit - IV: (14 Hrs)
Case Studies: Cellular concepts, global position system (GPS), Facsimile, Video text, Wifi, Bluetooth, IOT, cognative radio.

Suggested Books:

1. Analog and Digital Communications- Simon Haykin, John Wiley,2005
2. Electronic Communication Systems-Fundamentals through Advanced- Wayne Tomasi, 5th Edition, PHI, 2009.
3. Principles of Communication Systems- Herbart Taub, Donald L Schilinh, Goutam Saha,3rd Edition, Mcgraw-Hill,2008.
4. Electronics Communications- Dennis Roddy and John Coolean, 4th edition, PEA,2004
5. Electronics &Communication Systems- George Kennedy and Benard Davis, TMH 2004
6. Analog and Digital Communication- K Sam Shanmugam, Willey, 2005
7. Digital Communications, P. Ramakrishna Rao, TataMcGraw hills publishing Company Limited, New Delhi.2011.
8. Analog and Digital Communication systems- M.S. Roden, 3rd Edition, Prentice Hall of India.
10. Modern Digital and Analog Communication Systems - B.P. Lathi.
12. Telecommunication – T.H. Brewster, McGraw Hill.
13. Principles of Digital communication, Das, Chatterjee and Mallick, Wiley Eastern Ltd.

B.Sc. (Electronics) - III Year
Semester – VI
Paper – VI: (B) Digital communication Practical's
(DSE-2: Compulsory)

I. Study of

1. Pulse Amplitude modulation

2. Pulse code modulation

3. pulse width modulation

4. PulsePhase modulation

5. Amplitude Shift Key

6. Frequency shift key

7. Delta Modulation

8. Pulse shift keying

II. Experiments in Data Communication.

1) Study of serial communication.
2) Study of protocol in communications.
3) Study of Fiber optic communications.
4) Study of wireless communications.
5) Study of parallel communication.

Note: Minimum of 8 experiments to be performed.