Re-Accredited 'B++' 2.86 CGPA by NAAC
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વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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–: પરિપત્ર :–

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, NEP -2020 અંતર્ગત શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર S.Y.B.Sc. (Electronics) Sem.- 3 & 4 Major, Minor, MDC અને SEC નો પેટાસમિતિ દ્વારા તૈયાર કરવામાં આવેલ અભ્યાસક્રમ ભૌતિકશાસ્ત્ર વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ અભ્યાસ સમિતિવતી મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખાવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૦૧/૦૩/૨૦૨૪ ની સભાના ઠરાવ ક્રમાંક :૧૦૪ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત ઈ.ચા.માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૧૦૮૦૪/૨૦૨૪
તા.૨૨–૦૫–૨૦૨૪

કુલસચિવ

પ્રતિ,
૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓ.
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકો/વિદ્યાર્થીઓને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.
૩) પરીક્ષા નિયામકશ્રી,પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારૂ.

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NEP-2020 : Syllabus for S Y B Sc (Electronics) Major Semester-3
(With Effect From June 2024)

PAPER : 3 : Electronics Circuits and Application

(Total 4 Credit : 2 for Theory and 2 for Practical i.e. 4 Hours of Practical per week per batch)

Unit-I: Transistor Biasing

Introduction; Need for biasing; Factors contributing to thermal instability; Effect of temperature increase; Stability factor; Operating point; Different methods for transistor biasing: Fixed –bias circuit; Collector-to-base bias; Disadvantages of collector-to-base bias; Voltage divider bias with emitter bias; Bias compensation; Design operations

Unit-II: Small Signal Amplifier

Introduction; General "black box" theory; Generalized approximate model; Conversion of an amplifier circuit to a standard form; Hybrid h parameters; Obtaining the hybrid h-parameters; Simplified CE hybrid model; Typical h-parameter values

Introduction; Classification of amplifiers; General theory of amplifier Analysis; CE, CC, CB amplifier analysis using simplified hybrid model; Voltage and current gains taking into account Rg of source; Dependence of amplifier characteristics on RL and Rg; Effect of an emitter bypass capacitor and coupling capacitor on low frequency response; RC coupled transistor amplifier; Lower cut-off frequency f_1; Upper cut-off frequency f_2; Frequency response curve and band width;

Recommended Books :

1) A Mottershead, Electronics Devices and Circuits An Introduction, PHI, New Delhi.
2) R Boylestad and L Nashelsky, Electronics Devices and Circuits
3) I J Nagrath, Electronics Devices and Circuits, PHI, New Delhi (2007)
4) Millman, Halkias, Satyabrata, Electronics Devices and Circuits, TMH, New Delhi
5) Electron Device and Circuits. G K Mittal
5) Sanjeev Gupta, Electronics Devices and Circuits, Dhanpat Rai Publications

Experiments/ Laboratory work :

There will be four hours of laboratory/practical per week per batch. There will be ten students per batch for laboratory/practical work.

List of Experiments/Practical:

List of Experiments/Laboratory work for Semester-3 (Paper 3)

1. Study of h-parameter h_{fe} and h_{ie}
2. Study of RC Coupled Amplifier.
3. Study of CC amplifier.
4. Study of CB amplifier.
5. Study of basing circuits.
6. Study of emitter follower.
7. Study of h-parameter h_{re} and h_{oe}.

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NEP-2020 : Syllabus for S Y B Sc (Electronics) Major Semester-3
(With Effect From June 2024)

PAPER : 4 : Advance Digital Electronics & Circuit Design

(Total 4 Credit : 2 for Theory and 2 for Practical i.e. 4 Hours of Practical per week per batch)

Unit-I: Combinational Circuit Design

Simplification of Boolean expression, Concept of canonical form of Boolean expression, SOP and PSO expression, Basic principle of Karnaught Map methods for digital circuit design, concept of two, three, and four variable K-map, Don't care condition, digital circuit design using NAND, NOR, XOR and XNOR building blocks, combinational circuit design for Adder, Subtractor, and Multiplication, Design of Encode-Code circuits, (Binary-Gray-Binary, Binary-BCD-Binary,), concept of MUX and DMUX,

Unit-II: Flip-flops, counters, registers and Concept of Memory

Construction and working of RS Flip-flop, limitations, D flip-flop, construction and working of JK flip-flop, Master-slave JK Flip-flop, flip-flop as a memory element, types of semiconductor memory, RAM, ROM, EPROM, DRAM, SRAM etc.., basic concept of memory chip and its organization, address data lines, chip select-enable and its functions

Use of flip-flop as register, introduction to shift register, types of shift registers (SISO, SIPO, PIPO, PISO), Left-shift register Universal Shift register, Application of Shift register,

Introduction to Binary counter, basic ripple counter, working and waveforms of ripple counter, types of counters, Up/Down counters, modulus-2^N counter, design of counters with various modulus values, synchronous and asynchronous counters,

Reference Books:

1. Fundamentals of Digital Circuits by A Anand Kumar, PHI, New Delhi
2. Principles of Digital Electronics by K Meena, PHI, New Delhi
3. Digital Systems: Principles and Application, by Tocci and Widmer, PHI, New Delhi
4. Digital Computer Electronics by Malvino and Brown, McGraw Hill Education; 3rd edition
   Digital Electronics by Malvino and Leach, McGraw Hill Education; 8th edition

List of Experiments/Laboratory work for Semester-3 (Paper 4)

1. Study of D Flip-flop
2. Study of RS flip-flop.
3. Study of JK flip-flop.
4. Study of 4-bit up/down counter
5. Mode N counter
6. Shift register
7. Study Multiplexer and Demultiplxer
8. Study of decade counter.
9. 4 bit parallel binary addition/subtraction
10. BCD adder

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NEP-2020 : Syllabus for S Y B Sc (Electronics) Major Semester-3
(With Effect From June 2024)

PAPER :5 : Linear Power Electronics

(Total 4 Credit : Theory 04)

Unit-I: Rectifiers and Filters

Introduction; half and full wave rectifier; capacitor filter: capacitor filter with full wave rectifier, ripple voltage; Inductor filter: Inductor filter with full wave rectifier, L section filter.

Unit-II : Regulators

Introduction; Stabilization; Reference element, Zener shunt regulator: Designing of Zener shunt regulator; ripple, other features, limitation of basic Zener shunt regulator, Extending power and current range of basic Zener diode; Transistor shunt regulator, emitter follower regulator; Series pass regulators, Feedback regulators; Sample, reference, comparator and controller.

Three Terminal Regulators: Introduction, block diagram of three terminal regulator: applications of three terminal regulator; adjustable output voltage three terminal regulator; variable output power supply, dual power supply. (78xx series, 79xx series, LM317 & LM337)

Unit – III : Design of IC Regulated Power Supply using three terminal regulators

Introduction, basic circuit function of a three terminal regulator, the voltage reference, operation of regulator under fault modes, applications of three terminal regulator, basic regulator, current source, high current regulator, adjustable output voltage, variable output voltage regulator, high output voltage, dual power supply, adjustable voltage regulator with current limit protection.

Unit IV : Switch Mode Power Supplies

Introduction comparison of SMPS and linear type power supplies principle, flyback converters, forward type converters, selection of components of SMPS, selection of transformer, transistors, diodes and capacitors, control IC for SMPS, applications of SG 3524. UNINTERRUPTIBLE

Recommended Books:

1) N C Goyal& R K Khetan, Monograph on Electronics Design Principles, Khanna Publishers
2) M D Singh and K B Khanchandani, Power Electronics, TMH, New Delhi
3) A K Sawhney, Electricals and Electronics Measurement and Instrumentation,

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NEP-2020 : Syllabus for S Y B Sc Inter/Multidisciplinary Course Semester-3
(With Effect From June 2024)

Title of the Paper Inter/Multidisciplinary Course: Advance Microprocessor
(Total Credits 04 : Theory-02, Practicals-02 i.e. 4 hours per week per batch)

Unit-I: 8086 Architecture, Instruction Set and Programming Model

Pin description and architecture of 8086 microprocessor, Addressing modes, template for data transfer between register and register/memory, code generation using template, Instruction set of 8086 microprocessor,

Data transfer and data conversion instructions, Arithmetic and logical instruction, process control instruction, string instruction, branch and interrupt related instruction

Unit-II: 8087 Numeric co-processor

Need for numeric co-processor, overview and pin configuration of 8087 co-processor, data types of 8087 co-processor. Instruction set for 8087 co-processor

Assembly Language Program

Explanation of Assembly directives, multi byte addition and subtraction, computation of LCM, GCD of four numbers, computation of factorial, computation of Fibonacci numbers

Recommended Books:

1) Advanced Microprocessors & IBM-PC Assembly Language Programming, K Udaya Kumar and B S Umashankar, TMH
2) Microprocessors 8086/8088, 80186/80286, 80386/80486 and the Pentium Family, Nilesh B Bahadure, PHI, New Delhi.

Experiments/ Laboratory work :

There will be four hours of laboratory/practical per week per batch. There will be ten students per batch for laboratory/practical work.

List of Experiments/Practical:

1) Addition of two 8-bit numbers.
2) Subtraction of two 8-bit numbers.
3) Multiplication of two 8-bit numbers.
4) Division of 16-bit with 8-bit number.
5) Addition of two 16-bit numbers.
6) Multiplication of two 32-bit numbers.
7) Sum of n 8-bit numbers.
8) Print Array.

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NEP-2020 : Syllabus for S Y B Sc Inter/Multidisciplinary Course Semester-3
(With Effect From June 2024)

Title of the Paper Inter/Multidisciplinary Course: Bio-medical Instrumentation
(Total Credit 4 : Theory-04)

UNIT- 1

Bio-potentials, Bio-amplifiers and Bio-electrodes:

Introduction to bio-electric potential, bio-amplifier, components of man Instrument system, types of biomedical systems, design factors and limitations of biomedical instruments, terms and transducers to measure various physiological events, types of bio-potential electrodes (Body surface electrodes, Internal electrodes, Micro electrodes), electrolyte interface, electro decircuit model, impedance and polarization, Properties of electrodes .

UNIT- 2

Cardiac vascular system & measurements:

ECG: origin, Instrumentation, bipolar system lead system I, II, III, Einthovan's triangle, Augmented lead system, unipolar chest lead system, types of display.

UNIT- 3

Blood-pressure measurements: direct, indirect. Defibrillators: AC, DC. Pacemakers- Internal, External. Blood Flow meters: Electromagnetic blood flow meter, ultrasonic blood flow meter. Oximeters: Different types of oximetry systems, pulse oximeter.

UNIT - 4

Respiratory Measurement Systems: Types of volume, types of measurements, Instrumentation of respiratory system, principle & types of pneumo graph, Spirometer, pneumotacho meters, nitrogen wash out technique. Ventilators: Basic principles of ventilators, different generators, inspiratory phase and expiratory phase, types of ventilators

Medical Imaging system:-Thermal imaging system, working, IR detectors, applications. Radiography-conventional X-ray, properties, generation of X-ray, Fluoroscopy

Recommended Books:

1. Cromwell L., Wiebell F. J., Pfeiffer E A, Biomedical Instrumentation and Measurements, Second edition, Prentice Hall (2010), 2nd edition
2. Carr J.J, Brown J.M. Introduction to Biomedical Equipment Technology, Fourth edition, Pearson Education Inc (2010), 2nd edition
3. Khandpur R.S., Hand book of Biomedical Instrumentation, Second edition, Tata McGraw-Hill Publishing

(2009), 2nd edition
4. Joseph D. Bronzino, The Biomedical Engineering Handbook, IEEE Press (2000), 2nd edition, Volume 1.
5. Richard Aston, Principles of Biomedical Instrumentation & Measurement, Merrill Publishing Company,(1990), 1st edition
6. Mandeep Singh, Introduction to Biomedical Instrumentation, PHI learning private limited (2010), 1st edition

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NEP-2020 : Syllabus for S Y B Sc Inter/Multidisciplinary Course Semester-3
(With Effect From June 2024)

Title of the Paper Inter/Multidisciplinary Course: Analytical Instrumentation System
(Credits 04: Theory-04)

Unit - 1

Molecular Spectro-analytical Methods of Analysis:

Colorimetry and Spectrophotometry: Introduction, theory: molecular energy levels, types of molecular transitions, Lambert-Beer's Law and limitations, types of sources, monochromators and detectors, instrumentation of single beam and double beam instrument.

Unit - 2

Infrared Spectroscopy:

Theory, diatomic molecules as a simple harmonic oscillator, instrumentation, sample handling techniques. Fourier Transform Infrared Spectroscopy (FTIR): advantages, instrumentation qualitative and quantitative applications, interpretation of Infrared (IR) spectra.

Atomic Spectroscopy:

Principle, comparison of atomic and molecular spectroscopy, atomic transitions, atomic absorption, atomization process, types off lames-fuel/oxidant combinations, instrumentation of spectro-photometers; Interferences: spectral, chemical and ionization; applications. Atomic emission spectroscopy (AES): Flame photometer and its instrumentation, analysis using standard addition method, applications.

Unit - 3

Separation methods: Theory of chromatography; instrumentation and applications of Thin layer chromatography (TLC). **Column chromatography**: Principle, process of elution through a column, chromatogram, band broadening, capacity factor, selectivity factor, Column efficiency, number of plates, plate height, column resolution.

Unit - 4

Gas Chromatography (GC) : carrier gases, different type of injection systems, columns, stationary phases and detectors. Isothermal mode, temperature programming mode, analysis by internal standard method, applications.

High Performance Liquid Chromatography (HPLC): mobile phase, isocratic and gradient elution, pumps, injection systems, columns, stationary phases, normal phase and reverse phase chromatography, detectors and their application.

Recommended Books :

1. Skoog & Lerry, Instrumental Methods of Analysis, Saunders College Publications, NewYork
2. H. H. Willard, Instrumental Methods of Analysis, CBS Publishers.
3. D. C. Harris, Quantitate Chemical Analysis, W. H. Freeman
4. Christian G. D, Analytical Chemistry, John & Sons, Singapore

5. Skoog,Westand Holler, Analytical Chemistry, Saunders College Publications, NewYork
6. Vogel's Textbook of Qualitative Chemical Analysis, ELBS
7. J. A. Dean, Analytical Chemistry Notebook, McGraw Hill
8. John H. Kennedy, Analytical Chemistry: Principles, Saunders College Publication
9. W. Kemp, Organic Spectroscopy, ELBS
10. Handbook of Instrumental Techniques for Analytical Chemistry, Frank Settle, editor, Prentice Hall

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NEP-2020 : Syllabus for S Y B Sc Inter/Multidisciplinary Course Semester-3
(With Effect From June 2024)

Title of the Paper Inter/Multidisciplinary Course: Measurements & Transducers
(Credits: Theory-02, Practicals-02 i.e. 4 hours per week)

Unit – 1

Basic concepts of Instrumentation:

Generalized instrumentation systems block diagram representation, scope of instrumentation in Industrial organization.

Measurement Systems:

Static (accuracy, sensitivity, linearity, precision, resolution, threshold, range, hysteresis, dead band, backlash, drift), impedance matching and loading, dynamic characteristics (types, fidelity, speed of response, dynamic error).

Definition of errors- systematic errors, instrumental errors, environmental errors, random errors, loading errors, random errors, source of errors in measuring instruments, Uncertainties types, propagation of uncertainties)

Unit – 2

Transducers-

Classification, Active, Passive, Mechanical, Electrical, their comparison. Selection of Transducers, Principle and working of following types: Displacement transducers - Resistive (Potentio-metric, Strain Gauges – Types, Gauge Factor, bridge circuits, Semi-conductor strain gauge) Capacitive (diaphragm), Inductive(LVDT-Principle and characteristics, Hall effect sensors, magneto-strictive transducers).

Piezoelectric (Element and their properties, Piezo Electric coefficients. Equivalent circuit and frequency response of P.E. Transducers), light (photo-conductive, photo emissive, photo voltaic, semiconductor, LDR), Temperature (electrical and non-electrical). Pressure (force summing devices, load cell)

Recommended Books :

1. Doeblin & Manek, Measurement Systems, 4/e, McGraw Hill, New York, 1992, 5th edition
2. Nakra & Choudhary, Instrumentation Measurements and Analysis, Tata McGraw-Hill, 2nd edition
3. A. K. Sawhney, Electrical & Electronic Measurements & Instrumentation, 19th revised edition
4. Rangan, Sarma, and Mani, Instrumentation-Devices and Systems, Tata McGraw Hill 2nd edition
5. H. S Kalsi, Electronic Instrumentation, McGraw Hill, 4th edition
6. D V S Murthy, Measurement & Instrumentation, PHI
7. D. Patranabis, Sensors and Transducers, PHI, 2nd edition
8. Arun K. Ghosh, Introduction to Measurements and Instrumentation, PHI, 4th edition

Experiments/ Laboratory work :

There will be four hours of laboratory/practical per week per batch. There will be ten students per batch for laboratory/practical work.

List of Experiments/Practical:

1. Measurement of pressure, strain and torque using strain gauge.
2. Measurement of speed using Electromagnetic transducer.
3. Measurement of speed using photoelectric transducers
4. Measurement of angular displacement using Potentiometer.
5. Measurement of displacement using LVDT.
6. Measurement using load cells.
7. Measurement using capacitive transducer.
8. Measurement using inductive transducer.
9. Measurement of Temperature using Temperature Sensors/RTD.
10. Characteristics of Hall effect sensor.
11. Measuring change in resistance using LDR.

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NEP-2020 : Syllabus for S Y B Sc Inter/Multidisciplinary Course Semester-3
(With Effect From June 2024)

Title of the Inter/Multidisciplinary Course : Introduction to Microprocessor
(Total credit 4 : 2 for Theory & 2 for Practical i.e. 4 hours of Practical per week)

Unit-I: Microprocessor 8085A

Introduction; Intel 8085A: Architecture, functional diagram and pin configuration of microprocessor 8085, Register Structure, ALU, Timing and Control unit, Systems buses, Addressing modes and instructions of 8085A microprocessor, concept of Instruction Cycle, Concept of timing diagram of execution of basic operation of 8085A microprocessor, Concept of interrupt and Interrupt structure of 8085, Memory interfacing techniques and addressing scheme of 8085.

Unit – II Peripheral Chips for 8085A Microprocessor:

Programmable Peripheral Interface 8255; Functional Description: Operational Modes, Functional Organization, Block diagram of 8255; Programming and Operation; Programming in Mode 0, Mode 1 and Mode 2.
Programmable Interval Timer 8253: Modes of Operation: Mode 0, Mode 1, Mode 2, Mode 3,

Recommended Books:

1) R S Gaonkar, Microprocessor, TMH
2) Mathur, Microprocessor 8085 and its interfacing, 2nd Ed, PHI, New Delhi
3) The 8085 Microprocesor Architecture, Programming and Interfacing, K Udaya Kumar and B S Umashankar, Pearson Education
4) Srinath, 8085 Microprocessor: Programming and Interfacing, PHI, New Delhi
5) Ghose& Sridhar, 0000 to 8085 Introduction to Microprocessors for Engineers and Scientists, PHI New Delhi

Experiments/ Laboratory work :

There will be four hours of laboratory/practical per week. There will be ten students per batch for laboratory/practical work.

List of Experiments/Practical:

1. Addition of two/three and series of 8-bits/16-bits numbers
2. Decimal addition and Decimal subtraction
3. One's and Two's complement of 8-bit/16-bit
4. Shifting and Mask-off certain bits
5. To find largest number from a three data and data array
6. To arrange data in ascending order with concept of subroutine
7. To arrange data in descending order with concept of subroutine
8. To find smallest number from a three data and data array

(Note: Above list of Programs is only a suggestive list. Students should practice sufficient programs covering the complete Instruction set and concept of 8085A microprocessor programming.)

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NEP-2020 : Syllabus for S Y B Sc Skill Development/Enhancement Course Semester-3
(With Effect From June 2024)

Title of the Paper Skill Development/Enhancement Course: Design and Develop of Electronic Application Circuit

(Total Credits2 : Theory-00, Practicals-02 i.e. 4 hours per week per batch)

Design, develop and test following Electronics Application Circuits through PCB or on bread-board.

1) RC Coupled Amplifier.
2) 4-bit up/down counter and decade counter.
3) 4 bit parallel binary addition/subtraction
4) Zener diode as a regulated power supply
5) Design build and test variable output 3 terminal regulator
6) Design, build and test Astable multivibrator
7) Design, build and test Monostable multivibrator
8) Design, build and test Bistable multivibrator
9) Study of Push pull Amplifier
10) Study of characteristics of SCR.
11) Study of characteristics of UJT relaxation oscillator
12) To verify Ohm's law
13) To build and test KVL
14) To build and test KCL
15) To build and test Super position theorem
16) To build and test Thevenin's theorem
17) To build and test Norton's theorem
18) Application o diode in Wave shaping Circuits.

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NEP-2020 : Syllabus for F Y B Sc Skill Development/Enhancement Course Semester-3
(With Effect From June 2024)

Title of the Paper Skill Development/Enhancement Course: Embedded System Programing Language

(Total Credits2 : Theory-00, Practicals-02 i.e. 4 hours per week per batch)

1) Program to add two integers

2) Program to multiply two floating point integers

3) Program to Find the Size of int, float, double and char

4) Program to Check Whether a Number is Even or Odd

5) rogram to Find the Largest Number Among Three Numbers

6) Program to Check Leap Year

7) Program to Check Whether a Number is Positive or Negative

8) Program to Calculate the Sum of Natural Numbers

9) Program to Find Factorial of a Number

10) Program to Display Fibonacci sequence

11) Program to Count Number of Digits in an Integer

12) Program to Reverse a Number

13) Program to Check Armstrong Number

14) Program to Check Whether a Number is Prime or Not

15) Program to Find Largest Element in an Array

16) Program to Find the Frequency of Characters in a String

17) Program to remove all Characters in a String except Alphabets

18) Program to Find the Length of a String

19) Program to Concatenate Two Strings

20) Program to Copy String Without Using strcpy()

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for S Y B Sc (Electronics) Major Semester-4
(With Effect From June 2024)

Paper : 3 : Small and Large Signal Amplifiers

(Total 4 Credit : 2 for Theory and 2 for Practical i.e. 4 Hours of Practical per week per batch)

Unit-I: Feedback in Amplifier

Introduction; Feedback concepts; General theory of feedback; Reasons for negative feedback; Loop gain; Types of negative feedback in transistor circuits; Advantages of negative feedback; Change input impedance and output impedance in voltage series feedback, current shunt feedback, voltage shunt feedback, voltage series feedback, current shunt feedback, current series feedback; Increase in bandwidth; Stabilization; reduction in non-linear distortion; Reduction in noise; Emitter follower; Practical feedback circuits

Unit- II: Oscillators and Multivibrators

Oscillators: Introduction; Effect of positive feedback; Oscillator operations; Types of oscillators; Requirement for oscillator; Phase Shift oscillator; Wein bridge oscillators; Resonant circuit oscillator; Colpitt's oscillator, Hartley oscillator; Uni-juction oscillator; Schmitt trigger

Multivibrators: Introduction to multivibrators and transistor switch; Bistable multivibrator; Triggering of Bistable multivibrator, Astable multivibrator & Monostable multivibrator.

Introduction; Difference between voltage amplifier and power amplifier; Terms used in power amplifier; Class-A amplifier; Transformer coupled Class-A amplifier; Harmonic distortion in amplifier; Class-A Push-pull power amplifier; Class-B power amplifier; Class-B Push-pull amplifier; Cross-over distortion; Class-AB Push-pull amplifier; Complementary Symmetry Push-pull amplifier

Recommended Books:

1) A Mottershead, Electronics Devices and Circuits An Introduction, PHI, New Delhi.
2) Sanjeev Gupta, Electronics Devices and Circuits, Dhanpatrai Publications
3) R Boylestad and L Nashelsky, Electronics Devices and Circuits,
4) I J Nagrath, Electronics Devices and Circuits, PHI, New Delhi (2007)
5) Millman, Halkias, Satyabrata, Electronics Devices and Circuits, TMH, New Delhi

Experiments/ Laboratory work :

There will be four hours of laboratory/practical per week per batch. There will be ten students per batch for laboratory/practical work.

List of Experiments/Practical:

List of Experiments/Laboratory work for Semester-4 (Paper 3)

1. Study of Phase shift oscillator
2. Study of Wein bridge oscillator
3. Study of Colpitt's oscillator
4. Study of Hartley oscillator
5. Design, build and test Astable multivibrator
6. Design, build and test Monostable multivibrator
7. Design, build and test Bistable multivibrator
8. Study of Push pull Amplifier
9. Study of negative feedback in amplifier.

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for S Y B Sc (Electronics) Major Semester-4
(With Effect From June 2024)

Paper : 4 : Microprocessor

(Total 4 Credit : 2 for Theory and 2 for Practical i.e. 4 Hours of Practical per week per batch)

Unit-I: Microprocessor 8085A

Introduction; Intel 8085A: Architecture, functional diagram and pin configuration of microprocessor 8085, Register Structure, ALU, Timing and Control unit, Systems buses, Addressing modes and instructions of 8085A microprocessor, Data transfer Instruction, Arithmetic Instructions, Logical Instruction, Instruction for Branch, Machine control Instructions,

concept of Instruction Cycle; machine cycle, fetch cycle, T-states, Concept of timing diagram of execution of basic operation of 8085A microprocessor, Concept of interrupt, interrupt circuit, and Interrupt priority structure of 8085, Vectored and Non-vectored interrupt, Memory interfacing techniques and addressing scheme of 8085. Concept of I/O mapped I/O and Memory Mapped I/O for interrupt interface,

Unit-II: Assembly Language Programming

Concept and importance of algorithm and flow chart, introduction to assembler and use of assembler for the following programs

Suggested list of program to be done in class and practical

1. Add two 8-bit numbers, result can be 8-bits or more than 8-bits
2. Subtraction of two 8-bit numbers.
3. Addition of two/three 8-bits/16-bits numbers
4. Add series of 8-bits/16-bits numbers
5. Decimal addition and Decimal subtraction
6. One's and Two's complement of 8-bit/16-bits
7. Shifting and Mask-off certain bits
8. To find Largest number from a three/four data in data array
9. To find Smallest number from a three/four data in data array
10. To arrange data in ascending order with concept of subroutine
11. To arrange data in descending order with concept of subroutine
12. Movement/Shifting of data block data block from one memory location to other
13. Exchange of data block from one memory location to other
14. Binary up/down counter with appropriate delay
15. Decimal up/down counter with appropriate delay
16. Delay subroutine using one/two registers

(Note: Above list of Programs is only a suggestive list. Students should practice sufficient programs covering the complete Instruction set and concept of 8085A microprocessor programming.)

Recommended Books:

1) R S Gaonkar, Microprocessor, TMH
2) Mathur, Microprocessor 8085 and its interfacing, 2nd Ed, PHI, New Delhi
3) The 8085 Microprocesor Architecture, Programming and Interfacing, K Udaya Kumar and B S Umashankar, Pearson Education
4) Srinath, 8085 Microprocessor: Programming and Interfacing, PHI, New Delhi
5) Ghose & Sridhar, 0000 to 8085 Introduction to Microprocessors for Engineers and Scientists, PHI New Delhi

Experiments/ Laboratory work :

There will be four hours of laboratory/practical per week per batch. There will be ten students per batch for laboratory/practical work.

List of Experiments/Practical:

List of Laboratory Experiments Electronics for S Y B Sc Semester –4 : (Paper 4)

1. Addition of two and series of 8-bits/16-bits numbers
2. Decimal addition of two 8-bits/16-bits numbers
3. Decimal subtraction
4. One's and Two's complement of 8-bit/16-bits
5. Shifting and Mask-off certain bits
6. Largest number, smallest number from a data array
7. To arrange data in ascending and descending order
8. Movement of block of data and exchange of block of data from one memory location to other
9. Binary up/down counter with appropriate delay
10. Decimal up/down counter with appropriate delay
11. Delay subroutine using one/two registers

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for S Y B Sc (Electronics) Major Semester-4
(With Effect From June 2024)

Paper : 5 : Industrial Electronics

(Total 4 Credit : Theory 04)

Unit-I: Thyristors

Four layer devices, construction and working of an SCR, two transistor analogy, characteristics of SCR, construction working DIAC & DIAC characteristics, construction working TRIAC & TRIAC characteristics
Application of BJT as a switch; design of a BJT Switch; FET and MOSFET switches

Unit-II: Inverter-Choppers

SMPS: Introduction, comparison of SMPS, and linear type power supplies, principle, fly-back convertors, forward type converters, selection of transformer, transistors, diodes and capacitors, control IC for SMPS, applications of SG 3524.

Inverter-Choppers: principle of inverter: Series, parallel and bridge inverter, McMurray inverter, McMurray Bedford inverter, Voltage controlled and current source inverter, Principles of choppers: single and two thyriator chopper, step up chopper, AC chopper.

Unit- III : UPS Battery Charging

Types of UPS: Continuous duty UPS & stand by UPS, comparison, UPS configurations: forward and reverse transfer, selection of UPS, Component: Battery charger, battery bank and transfer switch.

BATTERY AND BATTERY CHARGERS: Electric current, electro chemical action in simple cell, primary and secondary cell, dry cell, lead acid accumulator or secondary cell, battery charging, testing of storage battery, maintenance of battery, button cells, resistance of battery, measurement of Internal resistance of a cell, Nickel cadmium rechargeable cell, comparison between Ni-Cad cell and lead acid cell, other sources of emf, solar cell, battery charger circuits.

Unit – IV : Noise

Noise: Types, reduction of induced voltage, evaluation of noise, noise in BJT and FET, Signal to noise power ratio, noise figure.

Recommended Books:

1) N C Goyal& R K Khetan, Monograph on Electronics Design Principles, Khanna Publishers
2) M D Singh and K B Khanchandani, Power Electronics, TMH, New Delhi
3) A K Sawhney, Electricals and Electronics Measurement and Instrumentation

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for S Y B Sc (Electronics) Minor Semester-4
(With Effect From June 2024)

Title of the Paper Course: Instrumentation System
(Total Credits 04 : Theory-02, Practicals-02 i.e. 4 hours per week per batch)

Unit – 1 **Measurement and Display**:
(Functional Block diagram and Operational aspect)
DC and AC indicating Instruments: Accuracy and precision - Types of errors, Basic Measurement Instruments-DC Bridges and applications: Wheatstone, Kelvin, AC Bridges: General form of AC bridge balance, comparison bridges, Maxwell, Hay, Schering, Wien, Wagner ground condition.
DC measurement: DC voltmeter, ammeter, ohmmeter, multimeter, AC measurement: voltmeter, ammeter. Digital type voltmeters, digital multimeter, Digital LCR meter. Digital frequency meter: Elements of frequency meter, universal counter and its different modes, measurement errors and extending the frequency range.
Electronic Displays: Cathode Ray Oscilloscope (CRO) and applications: Block diagram of a General Purpose Oscilloscope and its basic operation, electrostatic focusing and deflection, screens for CRT and graticules, CRT Connections, CRO probes. Types of CRO's: dual trace oscilloscope, digital storage oscilloscope, Sampling oscilloscope. Amplitude, Frequency, Phase measurements, Lissajous Figures.

Unit – 2 Signal Generators and Spectrum Wave Analyser
(Functional Block diagram and Operational aspect)
Types of generators and their operation: Audio oscillator, Function generators, Pulse generators, RF generators, Random noise generators, Sweep generator. Probes and Connectors: Test leads, shielded cables, connectors, low capacitance probes, high voltage probes, RF demodulator probes, special probes for IC's, current probes.
Spectrum Analyser and Wave meter: Frequency Spectrum, Distortion and wave measurement – Spectrum analyzer, Harmonic distortion analyzer, Intermodulation distortion analyzer, wave analyzer and distortion factor meter, wave meter, Different type of wave meters: Lumped and cavity wave meters, Q-meter and its applications.

Recommended Books :

1. H.S.Kalsi, Electronic Instrumentation, Tata McGraw Hill(2006)
2. JosephJCarr,Elements of electronic instrumentation and measurement, Pearson Education(2005)
3. C.S. Rangan, G.R. Sarma and V.S. Mani, Instrumentation Devices and Systems, Tata McGraw Hill(1998)

4. H. Cooper, Modern electronic instrumentation and measurement techniques, Pearson Education (2005)
5. R.A. Witte, Electronic test instruments: Analog and digital measurements, Tata McGraw Hill(2004)
6. S.Wolf and R.F.M. Smith, Student Reference Manual for Electronic Instrumentation Laboratories, Pearson Education (2004)

Experiments/ Laboratory work :

There will be four hours of laboratory/practical per week per batch. There will be ten students per batch for laboratory/practical work.

List of Experiments/Practical:

1. Study of Maxwell bridge
2. Study of Wein's bridge
3. Study of Owen's bridge
4. Study of Schering bridge
5. Study and operation of Multimeters (Analog and Digital),
6. Study of Function Generator, Regulated Power Supplies, CRO.
7. Study the generation of Lissajous figures to find unknown frequency and phase shift.
8. Frequency measurement using Wein Bridge.
9. Study of R, L, C and Q meter.
10. Study of DSO-Measurement of response time of relay using DSO.
11. Measurements of L, C, R using bridges.
12. To study bridge based loop tests.

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Skill Development/Enhancement Course Semester-4
(With Effect From June 2024)

Title of the Paper Skill Development/Enhancement Course: Designing Embedded System with Ardunio

(Total Credits2 : Theory-00, Practicals-02 i.e. 4 hours per week per batch)

Following list of Programs/Minor project-work is only a suggestive list and students are encourage to explore more of Ardunio application and learning. Students should perform this as an individual or in group for this Programs/Minor project-work with active participation and guidance from concern faculties. At the end of the semester students will prepare a report reflecting understanding and implementation aspect of this Programs/Minor project-work. The students will be examine for their conceptual understanding, know-how, operational concept and skill learned/developed through this Programs/Minor project-work.

1) Develop 8 x 8 LED Matrix7218 with Ardunio
2) Measurement of temperature using Ardunio
3) Develop fire alarm system using Ardunio
4) Measurement of distance using Ardunio
5) Control of LED using Ardunio through LDR
6) Intrude alarm system using Ardunio
7) Develop smart street light system using Ardunio
8) Application of touch switch using Ardunio
9) Develop Motion detection using Ardunio
10) Develop visitor counter using Ardunio