



Re-Accredited 'B++' 2.85 CGPA by NAAC

**VEER NARMAD SOUTH GUJARAT UNIVERSITY**  
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.

**વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી**

યુનિવર્સિટી કેમ્પસ, ઉદ્ધના-મગદલા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.

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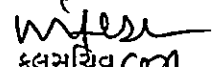
સંદર્ભ:યુનિવર્સિટી પરિપત્ર ક્રમાંક/એસ./સાયન્સ/પરિપત્ર/૧૬૨૧૮/૨૦૨૩ તા.૦૪/૦૭/૨૦૨૩

**-: પરિપત્ર :-**

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, NEP-2020 અંતર્ગત શિક્ષણ વિભાગના તા.૧૧/૦૭/૨૦૨૩ ના ઠરાવ અન્વયે, શૈક્ષણિક વર્ષ ૨૦૨૩-૨૪ થી અમલમાં આવનાર B.Sc.(Electronics) Sem.-1 અને Sem.-2 નો Major, Minor, Multidisciplinary, અને SEC નો 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.૦૭/૦૮/૨૦૨૩ ની સભાના ઠરાવ ક્રમાંક: ૯૯ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

(બિડાણ: ઉપર મુજબ )

ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૨૩૧૫૧/૨૦૨૩  
તા.૦૪-૦૮-૨૦૨૩

  
કુલસચિવ

પ્રતિ,

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

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc (Electronics) Major Semester-I  
(With Effect From June 2023)

PAPER : 1 : Basic Electrical Circuits  
(Total 4 Credit : 3 for Theory and 1 for Practical i.e. 2 Hours of Practical per week)

#### Unit I : Passive Circuit Elements

Resistors : resistor types, power ratings, resistor colour code/bands and value tolerance, resistor in series and in parallel, potentiometer variable resistor, Temperature coefficient, NTC&PTC, Checking resistors with Ohmmeter.

Inductors : comparison of different core, inductance of an inductor, energy stored in magnetic field, inductors in series and in parallel, Mutual inductance and Transformer, Construction and working, Introduction to transformer core materials, Q-factor of coil

Capacitors : capacitor connected to a battery, capacitance, factors controlling capacitance, types of capacitors(Fixed capacitor, variable capacitor), voltage rating of capacitor and leakage resistance, capacitors in series and parallel, energy stored in a capacitor, charging of a capacitor, Checking capacitor with Ohmmeter.

#### Unit II : Basic Laws of Electrical Science

Kirchhoff's Voltage Law, Kirchhoff's Current Law, determination of algebraic sign of voltage, assumed direction of current, applications of KVL, KCL, voltage division rule, current division rule, Superposition theorem, concept of ideal voltage source and constant current source, Thevenin's Theorem, Norton's theorem, Maximum power transfer theorem, Examples of circuit analysis using Thevenin's Theorem, and Norton's theorem.

#### Unit III : Semiconductors Theory and Junction Diode

Energy bands in solids, Valance band and conduction band, Insulator, Conductor and Semiconductor

Chemical bonds in semiconductors, effect of temperature on semiconductors, crystal structure, types of semiconductors, intrinsic semiconductor, Fermi level in intrinsic semiconductor, electrons and holes as charge carriers in semiconductors, extrinsic semiconductor, P-type and N-type semiconductor, majority and minority carriers.

P-N Junction, formation of charge depletion layer, potential barrier and width of depletion region across the junction, energy band diagram of PN Junction, forward bias and reverse bias conditions,  $V \rightarrow I$  characteristics of diode, diode equation, Construction and working of Diode, Zener diode, Photo-diode, and varactor diode, Breakdown in diodes, Avalanche breakdown, Zener breakdown, Clippers and Clamping Circuits, its operation and applications.

Reference Books:

- 1) Fundamentals of Electrical Engineering and Electronics by B L Theraja, S Chand, New Delhi
- 2) Basic Electronics by Grob, Mc Graw-Hill Education ; 8th edition
- 3) Fundamentals of Electric Circuits by Sammuel Oppenheime, Prentice Hall
- 4) Electronic Components and Materials by SMDHIR, Tata McGraw Hill Education

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc (Electronics) Major Semester-1  
(With Effect From June 2023)

PAPER : 2 : Digital Electronics

(Total 4 Credit : 3 for Theory and 1 for Practical i.e. 2 Hours of Practical per week)

#### Unit I : Number Systems and Codes

Introduction to number systems, Decimal, Binary, Octal and Hexadecimal number systems, their inter conversion, binary and hexadecimal arithmetic (Add and Subtract in Binary and Hexadecimal only), Representation of negative numbers in binary (1's and 2's complement; Add and Subtract in 1's and 2's complement), Binary codes; 8421, BCD (BCD addition, BCD arithmetic 9's and 10's complement; Add and Subtract), Excess-3 code, Gray code (encoding and decoding Binary-to-Gray and vice-versa), ASCII code, Concept of error detecting codes (parity bit, check sum) and error detecting and correcting code (Hamming code method).

#### Unit II : Boolean Algebra and Logic Gates

Boolean algebra: Postulates and theorems, logic functions, minimization of Boolean functions using algebra and Karnaugh map methods (upto 4 variables).  
Definition of logic gate, Basic logic Gates: AND, OR, NOT, truth table, NAND & NOR gates, De-Morgan's Theorem, NAND & NOR as universal logic gates  
Special logic gates like XOR and XNOR its logic and truth-table.  
Introduction to logic families, characterization of TTL logic family, Characterization of CMOS family, Basic and Universal gates TTL.

#### Unit III : Application of Logic Gates

Construction/Realization of Logic diagram/circuit from expression and vice versa using basic and universal logic gates. Need/Importance of simplified/reduced Boolean expression for better digital circuit.

Design and realization of Half-adder, full-adder, half-subtractor, full-subtractor, Construction and working concept of multiplexer and demultiplexer (8-to-1 and 1-to-8 lines), Binary to Gray and Gray to Binary Circuit design examples

Applications of XOR gates: Code converter, Controlled inverter, parity checker, parity (odd, even) generator, word comparator

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; 8<sup>th</sup> edition

List of Experiments/Laboratory work for Semester-1 (Paper 1 & 2)

1. Plotting of electronic signals
  - a. Linear  $y = mx + c$
  - b. Exponential  $y = A \cdot e^x$  and  $y = A \cdot e^{-x}$
  - c. Sinusoidal  $y = A \cdot \sin(x)$  and  $y = A \cdot \cos(x)$
2. Study of testing of various active and passive components.
3. Study of KVL.
4. Study of KCL.
5. Verification of Norton's theorem.
6. Study of Thevenin's theorem.
7. Study of Superposition theorem.
8. Study of characteristics of diode.
9. Study of characteristics of Zener diode.
10. Study of Basic Logic Gates
11. Study of Universal Logic Gates
12. Study of XOR and XNOR Gates
13. Design, built and test Half and Full adder circuit
14. Design, built and test Half and Full Subtractor circuit
15. Study of Multiplexer and Demultiplexer.
16. Design, built and test Code converter

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Minor Semester-1

(With Effect From June 2023)

Title of the Paper Electronics (Minor Course) : Basics of Electronics

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

Unit – 1 Electronics Components :

Resistors : Colour code, nominal values, tolerance and limitations, series and parallel resistors, different kinds of resistors (viz linear carbon, carbon film, metallic film, wire wound, non-conductive type etc.), Resistor having P.T.C., NTC, V.D.R., L.D.R and its application, Potentiometers and Pre-sets.

Capacitors : construction, dielectric and their types, dielectric constant, polar and non-polar capacitors, Capacitance to size ratio, kinds of capacitors and its specification.

Inductors : Construction, types, core material, their kinds and specifications, Self-inductance, mutual inductance, series and parallel combination.

Switches : Types of switches (Toggle, S.P.D.T., D.P.D.T., push to ON/OFF, Multi way switch, Micro switch, Relay, Thumb wheel) Working and application, Debounce in switch.

Laws of Electrical Science : Voltage drop, series and parallel circuit, Kirchhoff's Voltage Law, Kirchhoff's Current Law, applications of KVL, KCL, voltage division rule, current division rule, Super position theorem, concept of ideal voltage source and constant current source, Thevenin's Theorem, Norton's theorem,

Unit – II Basics of Digital Electronics :

Number System and Codes : Concepts of various number system (Decimal, Binary, Hexadecimal, Octal) its inter conversion, Various codes (BCD, weighted and non-weighted, 8421, excess 3, Gray, ASCII), Gray code (encoding and decoding Binary-to-Gray and vice-versa), various error detecting and correcting codes (parity bit, check sum, Hamming).

Binary Arithmetic : Binary and Hexadecimal addition and subtraction, various method for representation of negative number in Binary 1's, 2's, and its arithmetic.

Boolean algebra, truth table functioning, the AND, OR, NOT operators, Laws and theorems of Boolean algebra, De'Morgan's theorem, basic equality of Boolean algebra, dual expression in Boolean algebra, Positive and negative logic, various basic and universal logic gates, its ANSI/IEEE symbols, logic and truth table, logic diagram, circuit from expression and vice versa using basic and universal logic gates, Reduction of Boolean Expression using Boolean Laws, necessity and various techniques for reducing Boolean expressions. Special logic gates (XOR, XNOR) and its application, Construction and working concept of multiplexer and demultiplexer (8-to-1 and 1-to-8 lines).

## RECOMMENDED BOOKS :

- 1) Streeman, Solid State Electronics Devices, PHI, New Delhi.
- 2) Fundamental of Electronics, by B L Theraja.
- 3) Fundamentals of Electrical Engineering and Electronics by B L Theraja
- 4) Basic Electronics by Grob,
- 5) Electronic Components and Materials by S M DHIR
- 6) M Mano Digital Logic and Computer Design, PHI, New Delhi.
- 7) AAnand Kumar, Fundamentals of Digital Circuits, PHI, New Delhi.
- 8) Malvino Leach, Digital Principles and Application, TMH, New Delhi.
- 9) Principles of Digital Electronics by K Meena, PHI, New Delhi.
- 10) Digital Systems: Principles and Application, by Tocci and Widmer, PHI

## 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. Identification and testing of various types of active and passive components.
2. Identifying and value measurement of resistors with help of multimeter and colour bands.
3. Study of various switches.
4. Study of parallel and series combination of resistors.
5. Study of KVL.
6. Study of KCL.
7. Study of Superposition theorem.
8. Study of Norton's theorem.
9. Study of Thevenin's theorem.
10. Study of Basic logic gates.
11. Study of Universal logic gates.
12. Realization of basic logic gates using universal logic gates.
13. Study of XOR and XNOR gates.
14. Study Multiplexer and Demultiplexer.
15. Study of Code converter (Binary-to-Gray&Gray-to-Binary)

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F<sub>Y</sub> B Sc Minor Semester-1  
(With Effect From June 2023)

Title of the Paper Electronic Instrumentation (Minor Course) : Measurement Systems  
(Total Credits 4 : Theory-02, Practicals-02 i.e. 4 hours per week)

Unit – 1 Basic Measurement System :

Measurement, significance, method of measurement, direct and indirect methods of measurement, classification of instruments, deflection and null type instruments, comparison, Analog and digital type, functions of instruments and measurement system, elements of generalized measurement system, functional blocks, applications, rudimentary pressure gauge, boastan tube pressure gauge etc, input output configuration of measurement system, desired input, interfering inputs and modifying output, method of corrections, examples.

Measurement system performance, static calibration, static characteristics, error, absolute and relative error, accuracy and precision, true value, scale range, span, reproducibility and drift, repeatability, static sensitivity and linearity, hysteresis, threshold, resolution, loading effect, limiting error, relative limiting error, combination of error, types of error, gross error, systematic error, random error, statistical instrument of data, histogram, arithmetic mean, deviation, average and standard variance, normal Gaussian error distribution curve, (non-mathematical approach), probability curve, probable error,

AC bridges, general equation, Balanced condition, Desauty, Maxwell, Owens, Schering, Weins bridge, PMMC, error in ammeter and voltmeter, PMMC construction, torque equation, ammeter, shunt, effect of leap conversion into voltmeter, multi range voltammeter, Ohm meter, Series and shunt type.

Unit – II Basic Electronics Components :

Passive Devices:

Resistors : Colour code, nominal values, tolerance and limitations, different kinds of resistors (viz linear carbon, carbon film, metallic film, wire wound, non-conductive type etc.), Resistor having P.T.C., NTC, V.D.R., L.D.R and its application, Potentiometers and Pre-sets.

Capacitors : construction, dielectric and their types, dielectric constant, polar and non-polar capacitors, charging and discharging of capacitor

Inductors : Construction, types, core material, their kinds and specifications, Self-inductance, mutual inductance, series and parallel combination.

Active Devices: Semiconductors, extrinsic semiconductor, P-type, N-type, majority & minority carriers, formation of PN Junction, charge depletion region, PN junction in equilibrium, forward bias, reverse bias, diode characteristics, Breakdown in diodes, Zener breakdown, avalanche breakdown. Photo-Voltaic cell Light activated PN junction devices, LDR, Photo diodes, Photovoltaic Cell, Photo transistor, Opto-couplers, Opto-isolators.

#### RECOMMENDED BOOKS :

- 1) Measurement Systems, Doebelin & Manek, 4/e, McGraw Hill, New York, 1992,5th edition
- 2) Instrumentation Measurements and Analysis , Nakra & Choudhary ,Tata McGraw-Hill, 2nd edition
- 3) Electrical & Electronic Measurements & Instrumentation, A.K. Sawhney , 19th revised edition
- 4) Instrumentation- Devices and Systems, Rangan, Sarma, and Mani, Tata-McGraw Hill 2nd edition
- 5) Electronic Instrumentation, H. S Kalsi, McGraw Hill, 4th edition
- 6) Measurement & Instrumentation, DVS Murthy, PHI
- 7) Solid State Electronics Devices, Streeman, PHI, New Delhi.
- 8) Fundamental of Electronics, by B L Theraja.
- 9) Fundamentals of Electrical Engineering and Electronics by B L Theraja
- 10) Basic Electronics by Grob,

#### Experiments/ Laboratory work :

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

#### List of Experiments/Practical:

- 1) Identification and testing of various types of active and passive components.
- 2) Identifying and value measurement of resistors with help of multimeter and colour bands.
- 3) Study of parallel and series combination of resistors.
- 4) Diode Characteristics
- 5) Zener Diode Characteristics
- 6) Study of Photo Diode
- 7) Study of Photo transistor characteristics
- 8) Charging and discharging of capacitor
- 9) Study of Thermistor
- 10) Study of Maxwell bridge
- 11) Study of Wein's bridge
- 12) Study of Owen's bridge
- 13) Study of Schering bridge
- 14) Study of errors

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-1  
(With Effect From June 2023)

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

Unit – I Passive Components :

Resistors : Colour code, nominal values, tolerance and limitations, different kinds of resistors (viz linear carbon, carbon film, metallic film, wire wound, non-conductive type etc.), Resistor having P.T.C., NTC, V.D.R., L.D.R and its application, Potentiometers and Pre-sets.

Capacitors : construction, dielectric and their types, dielectric constant, Q-factor, power factor, Dielectric losses polar and non-polar capacitors, Capacitance to size ratio, kinds of capacitors and its specification.

Inductors : Construction, types, core material, their kinds and specifications, Self-inductance, mutual inductance, series and parallel combination.

Unit – II Active Components :

Semiconductors, extrinsic semiconductor, P-type , N-type, majority & minority carriers, formation of PN Junction, charge depletion region, PN junction in equilibrium, forward bias, reverse bias, diode characteristics, diode equation. Breakdown in diodes, Zener breakdown, avalanche breakdown. Photo-Voltaic cell Light activated PN junction devices, LED, LDR, Photo diodes, Photovoltaic Cell, Photo transistor, Opto-couplers, Opto-isolators, Semiconductor LASER, Photo detector. Construction, Working and types of various display devices like LCD, Dot-matrix Display, Seven segment display, LED Display, Alpha-numeric display.

RECOMMENDED BOOKS :

- 1) Streeman, Solid State Electronics Devices, PHI, New Delhi.
- 2) Fundamental of Electronics, by B L Theraja.
- 3) Fundamentals of Electrical Engineering and Electronics by B L Theraja
- 4) Basic Electronics by Grob,
- 5) Electronic Components and Materials by S M DHIR

Experiments/ Laboratory work :

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

List of Experiments/Practical:

- 1) Study of characteristics curve of diode.
- 2) Study of characteristics curve of Zener diode.
- 3) Study of characteristics curve of photo diode
- 4) Study of photo transistor.
- 5) Identification and testing of various types of active and passive components.
- 6) Identifying resistors with help of multimeter and colour bands.
- 7) Study of charging of a capacitor
- 8) Study of mounting of various components on general purpose PCB.

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-1  
(With Effect From June 2023)

Title of the Paper Inter/Multidisciplinary Course: Fundamentals of Digital Electronics  
(Total Credits 4 : Theory-02, Practicals-02 i.e. 4 hours per week)

Unit – I Basics of Digital Electronics :

Number System and Codes : Concepts of various number system (Decimal, Binary, Hexadecimal, Octal) its inter conversion, Various codes (BCD, weighted and non-weighted, 8421, excess 3, Gray, ASCII), Gray code (encoding and decoding Binary-to-Gray and vice-versa), various error detecting and correcting codes (parity bit, check sum, Hamming).

Binary Arithmetic : Binary and Hexadecimal addition and subtraction, various method for representation of negative number in Binary 1's, 2's, and its arithmetic.

Unit – II Boolean Algebra & Logic Gates

Boolean algebra, truth table functioning, the AND, OR, NOT operators, Laws and theorems of Boolean algebra, De'Morgan's theorem, basic equality of Boolean algebra, dual expression in Boolean algebra, Positive and negative logic, various basic and universal logic gates, its ANSI/IEEE symbols, logic and truth table, logic diagram, circuit from expression and vice versa using basic and universal logic gates, Reduction of Boolean Expression using Boolean Laws, necessity and various techniques for reducing Boolean expressions. Special logic gates (XOR, XNOR) and its application, Construction and working concept of multiplexer and demultiplexer (8-to-1 and 1-to-8 lines).

RECOMMENDED BOOKS :

- 1) M Mano Digital Logic and Computer Design, PHI, New Delhi.
- 2) A Anand Kumar, Fundamentals of Digital Circuits, PHI, New Delhi.
- 3) Malvino Leach, Digital Principles and Application, TMH, New Delhi.
- 4) Principles of Digital Electronics by K Meena, PHI, New Delhi.

Experiments/ Laboratory work :

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

List of Experiments/Practical:

- 1) Study of basic logic gates.
- 2) Study of Universal logic gates.
- 3) Realization of basic logic gates using universal logic gates.
- 4) Study of XOR and XNOR gates.
- 5) Study Multiplexer and Demultiplexer
- 6) Study of Code converter Circuit (Binary-to-Gray and Gray-to-Binary)
- 7) Study of Half Adder.
- 8) Study of Full Adder
- 9) Study of Half subtractor
- 10) Study of Full subtractor
- 11) Study of 4 bit binary adder circuit.
- 12) Study of 4 bit binary subtractor circuit.

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-1  
(With Effect From June 2023)

Title of the Paper Inter/Multidisciplinary Course: Electronics for Computer Science  
(Total Credit 4 : Theory-02, Practicals-02 i.e. 4 hours per week)

Unit – I : Number Systems and Codes

Introduction to number systems, Decimal, Binary, Octal and Hexadecimal number systems and their inter conversion, negative number representation methods, arithmetic (Add and Subtract) in Binary and Hexadecimal number systems,

Basic Logic Gates : AND, OR, NOT, NAND & NOR as universal logic gates, special logic gates XOR and XNOR truth table. Introduction, Construction and working concept of multiplexer and demultiplexer (8-to-1 and 1-to-8 lines).

Unit II : Flip-flops, Registers and Memory

Construction and working of clocked RS Flip-flop and its limitations, construction and working of D flip-flop, construction and working of JK flip-flop, Concept of flip-flop trigger, pre-set and clear, Introduction of flip-flop as a memory element,

Use of flip-flop as register, introduction to shift register, types of shift registers.

Concept of Memory, types of semiconductor memory, RAM, ROM, EPROM DRAM, SRAM etc. basic concept of memory organization, address lines and data lines of memory, concept of data read/write in memory, memory chip select-enable and its functions. Introductions to memory address decoding and mapping.

Recommended Books:

- 1) M Mano Digital Logic and Computer Design, PHI, New Delhi.
- 2) A Anand Kumar, Fundamentals of Digital Circuits, PHI, New Delhi.
- 3) Malvino Leach, Digital Principles and Application, TMH, New Delhi.
- 4) Principles of Digital Electronics by K Meena, PHI, New Delhi.

Experiments/ Laboratory work :

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

List of Experiments/Practical:

- 1) Study of basic logic gates.
- 2) Study of Universal logic gates.
- 3) Realization of basic logic gates using universal logic gates.
- 4) Study of XOR and XNOR gates.
- 5) Study Multiplexer and Demultiplexer
- 6) Study of D Flip-flop
- 7) Study of RS flip-flop.
- 8) Study of JK flip-flop.
- 9) Study of Half Adder.
- 10) Study of Full Adder
- 11) Study of Half subtractor
- 12) Study of Full subtractor
- 13) Study of 4 bit binary adder circuit.
- 14) Study of 4 bit binary subtractor circuit.

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-I  
(With Effect From June 2023)

Title of the Paper Inter/Multidisciplinary Course: Introduction to Instrumentation System  
(Total Credit 4 : Theory-02, Practicals-02 i.e. 4 hours per week)

Unit – 1 Basic of Measurement :

Measurement, significance, method of measurement, direct and indirect methods of measurement, classification of instruments, deflection and null type instruments, comparison, Analog and digital type, functions of instruments and measurement system, elements of generalized measurement system, functional blocks, applications, rudimentary pressure gauge, boastan tube pressure gauge etc, input output configuration of measurement system, desired input, interfering inputs and modifying output, method of correlations, examples.

Unit – II Bridges

AC bridges, general equation, Balanced condition, Desauty, Maxwell, Owens, Schering, Weins bridge, PMMC, error in ammeter and voltmeter, PMMC construction, torque equation, ammeter, shunt, effect of leap conversion into voltmeter, multi range voltammeter, Ohm meter, Series and shunt type.

RECOMMENDED BOOKS :

- 1) Measurement Systems, Doebelin & Manek, 4/e, McGraw Hill, New York, 1992,5th edition
- 2) Instrumentation Measurements and Analysis , Nakra & Choudhary ,Tata McGraw-Hill, 2nd edition
- 3) Electrical & Electronic Measurements & Instrumentation, A.K. Sawhney , 19th revised edition
- 4) Instrumentation- Devices and Systems, Rangan, Sarma, and Mani, Tata-McGraw Hill 2nd edition

Experiments/ Laboratory work :

There will be two hours of laboratory/practical per week. 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 of errors
- 6) Measurement of displacement using LVDT.
- 7) Measurement using load cells.
- 8) Measurement using capacitive transducer.
- 9) Measurement using inductive transducer

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Skill Development/Enhancement Course Semester-1  
(With Effect From June 2023)

Title of the Paper Skill Development/Enhancement Course: Basics for Repair & Maintenance  
of Equipment

(Total Credits 2 : Theory-01, Practicals-01 i.e. 2 hours per week)

Unit – I

Basic Measurement Instruments: DC measurement: dc voltmeter, ohmmeter and ammeter. Digital type voltmeter, ammeter and ohmmeter , digital multimeter, AC measurement , voltmeter, ammeter .Digital frequency meter: elements of frequency meter, universal counter and its different modes, measurement errors and extending the frequency range. Digital LCR-Q meter, digital wattmeter

Unit – II

Basic of Soldering, Solder and its specifications, Soldering metal and its types, De-soldering pump, De-soldering gauges, characteristics and function of solder and flux Soldering flux, difference between a through-hole and surface-mount component, importance of selecting the correct solder iron tip for soldering, importance of selecting the correct solder wire for soldering

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc (Electronics) Major Semester-2  
(With Effect From June 2023)

PAPER : 1 : Semiconductor Devices

(Total 4 Credit : 3 for Theory and 1 for Practical i.e. 2 Hours of Practical per week)

**Unit I : AC fundamentals and diode circuits**

Types of AC waveforms, definitions of cycle, frequency, amplitude, time period, characteristics of sine wave, different values of sine wave, instantaneous value, peak value, peak-to-peak value, RMS value, average value, phase difference

Diode clipper circuits, clamper circuits, voltage doubler circuit

**Unit II : Bipolar Junction Transistors**

Construction of BJT, fundamentals of BJT operation, transistor current components, PNP and NPN devices, CE configuration transistor characteristics, transistor biasing, DC load-line for CE configuration, operating point, cut off region and saturation region, active region, transistor action, Gain of a transistor common emitter current gain  $\beta$ , common base current gain  $\alpha$ , their inter relationship, BJT as a switch.

Junction field effect transistor, Comparison of JFET and BJT, Construction Principle of operation and characteristic curve of FET, static characteristics of JFET, MOSFET construction working and characteristics

**Unit III : Opto electronics devices**

Construction, principle of operation and working of Light Emitting Diode, Photodiode, phototransistor

UJT construction, working and I-V characteristics

**Reference Books:**

1. Basic Electronics by B L Theraja
2. Electrical Engg Fundamentals by Del Toro, PHI, New Delhi
3. Electronic Devices and Circuits Allen Mottershead, PHI, New Delhi
4. Fundamentals of Electric Circuits by Samuel Oppenheimer  
Electronic Components and Materials by SMDHIR

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc (Electronics) Major Semester-2  
(With Effect From June 2023)

Paper : 2 : Network Analysis and Filters

(Total 4 Credit : 3 for Theory and 1 for Practical i.e. 2 Hours of Practical per week)

Unit I : Laplace Transforms and its applications

Laplace transform, Laplace transform of various mathematical functions and unit step function, Laplace transform of integration and differentiation inverse Laplace transform

Unit II : Sinusoidal function

Sinusoidal functions, average and effective value, average power, phasor representation, sinusoidal steady state response of R, C, L, RL and RLC circuits  
Fourier theorem, Fourier series, Fourier coefficients

Unit III : Resonance

Resonance, Q factor, series resonance and band width, parallel resonance and band width, reactance curve, image impedance  
Filter fundamentals, cut-off frequency, pass band and stop band, high pass filters, low pass filters, band pass filters, band reject filters,

Reference Books:

1. Basic Electronics by B L Theraja
2. Electrical Engg Fundamentals by Del Toro
3. Fundamentals of Electric Circuit by Sammuel Oppenheime
4. Networks Lines and Fields by J D Ryder

List of Experiments/Laboratory work for Semester-2 (Paper 1 & 2)

1. Study of series resonance and its band width  $Q$ .
2. Study of Parallel resonance and its band width and  $Q$ .
3. Study of low pass T filter circuit.
4. Study of low pass  $\pi$  filter circuit.
5. Study of high pass T filter circuit.
6. Study of high pass  $\pi$  filter circuit.
7. Wave shaping circuits using diode
8. Charging and discharging of capacitor through RC
9. Study of characteristics curve of BJT.
10. Study of characteristics curve of FET.
11. Study of characteristics curve of Light Emitting Diode
12. Study of characteristics curve of photo diode, photo transistor
13. Thermistor Characteristics
14. Load Line
15. UJT Characteristics

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Minor Semester-2  
(With Effect From June 2023)

Title of the Paper Electronics (Minor Course) : Semiconductor Devices & Logic Circuits  
(Credits: Theory-02, Practicals-02 i.e. 4 hours per week)

Unit – I Semiconductors Devices :

Energy band diagrams, classification of Solids, intrinsic semiconductor, energy band diagram of Semiconductors, free charge carriers, electrons, holes, Fermi level, extrinsic semiconductor, P-type , N-type, majority & minority carriers, formation of PN Junction, charge depletion region, PN junction in equilibrium, forward bias, reverse bias, diode characteristics, diode equation. Breakdown in diodes, Zener breakdown, avalanche breakdown.

Opto Electronics & Display Devices: Photo-Voltaic cell Light activated PN junction devices, LED, LDR, Photo diodes, Photo transistor, Seven segment display, LED Display.

Junction Transistors : Construction of BJT, fundamentals of BJT operation, transistor current components, PNP and NPN devices, CE, configurations transistor characteristics transistor biasing, DC load line for CE configuration, operating point, cut-off region and saturation region, active region, transistor action, Gain of a transistor common emitter current gain  $\beta$ , common base current gain  $\alpha$ , their inter relationship, leakage current in transistor, its effect on the operating point, BJT as a switch. Comparison of JFET and BJT, advantage of Unipolar device, Construction of FET, characteristic curve of JFET, introduction to MOSFET its construction, Principle and operation and I-V characteristics, Handling and its gate protection.

Unit – II Combinational and Sequential Circuits Design :

Combinational Logic Analysis and Design: Standard representation of logic functions (SOP and POS), K Maps & its application in Circuits Design, Mean term and max term in Boolean expression, introduction of K map, drawing k map for 3 variable and 4 variable expressions, pairs, quads, octet in K map, reduction of Boolean expression using K map, Don't care problems and concept of redundant groups, various design examples (Half adder, full adder, half subtractor, full subtractor, Code Converter, BCD Adder)

Sequential logic design: Latches and Flip flops, Counters and Registers, Flip-flop as memory element, concept of timing-clock in flip-flop, design construction and operation of RS, Clocked RS, D, JK, T, and Master-Slave JK flip-flops, various triggering methods of flip-flop, application of flip-flop to counters, synchronous asynchronous counters, various types of counters (Binary, ripple, up, down, ring , Decade, modulus) Registers, various types of shift registers and its operations (SISO, SIPO, PIPO, PISO, Left-shift register Universal Shift register), concept of various memory chips.

## RECOMMENDED BOOKS :

- 1) Solid State Electronics Devices, Streeman, PHI, New Delhi.
- 2) Fundamental of Electronics, by B L Theraja.
- 3) Fundamentals of Electrical Engineering and Electronics by B L Theraja
- 4) Basic Electronics by Grob,
- 5) Electronic Components and Materials by S M DHIR
- 6) Digital Logic and Computer Dcsign, M Mano, PHI, New Dclhi.
- 7) Fundamentals of Digital Circuits, AAnand Kumar, PHI, New Delhi.
- 8) Digital Principles and Application, Malvino Leach, TMH, New Delhi.
- 9) Principles of Digital Electronics by K Meena, PHI, New Delhi.
- 10) Digital Systems: Principles and Application, by Tocci and Widmer, PHI

## Experiments/ Laboratory work :

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

## List of Experiments/Practical:

- 1) Study of characteristics curve of diode.
- 2) Study of characteristics curve of Zener diode.
- 3) Study of characteristics curve of photo diode and photo transistor.
- 4) Study of characteristics curve of BJT.
- 5) Study of characteristics curve of FET.
- 6) Study of transistors as a switch.
- 7) Study of D Flip-flop
- 8) Study of RS flip-flop.
- 9) Study of JK flip-flop.
- 10) Study of 4-bit up/down counter
- 11) Design, built and test Code Converter Circuit (Binary to Gray and Gray to Binary).
- 12) Design, build and test Half adder
- 13) Design, build and test Full adder.
- 14) Design, build and test Half subtractor
- 15) Design, build and test Full subtractor circuits.

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NEP-2020 : Syllabus for F Y B Sc Minor Semester-2  
(With Effect From June 2023)

Title of the Paper Electronic Instrumentation (Minor Course) : Sensors, Transducers &  
Digital Electronics  
(Credits: Theory-02, Practicals-02 i.e. 4 hours per week)

Unit – I Transducers & Sensors:

Transducers - Classification, Active, Passive, Mechanical, Electrical, their comparison. Selection of Transducers, Principle and working of following types: Displacement transducers - Resistive (Potentiometric, Strain Gauges – Types, Gauge Factor, bridge circuits, Semiconductor 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)

Unit – II Basics of Digital Electronics :

Number System and Codes: Concepts of various number system (Decimal, Binary, Hexadecimal, Octal) its inter conversion, various codes (BCD, weighted and non-weighted, 8421).

Binary Arithmetic: Binary and Hexadecimal addition and subtraction, various method for representation of negative number in Binary 1's, 2's, and its arithmetic, Boolean algebra, truth table functioning, the AND, OR, NOT operators, Laws and theorems of Boolean algebra, De'Morgan's theorem, basic equality of Boolean algebra, dual expression in Boolean algebra, various basic and universal logic gates, its ANSI/IEEE symbols, logic and truth table, logic diagram, circuit from expression and vice versa using basic and universal logic gates, Reduction of Boolean Expression using Boolean Laws, necessity and various techniques for reducing Boolean expressions. Special logic gates (XOR, XNOR) and its application, Construction and working concept of multiplexer and demultiplexer (8-to-1 and 1-to-8 lines).

#### RECOMMENDED BOOKS :

- 1) Measurement Systems, Doebelin & Manek, 4/e, McGraw Hill, New York, 1992, 5th edition
- 2) Instrumentation Measurements and Analysis, Nakra & Choudhary, Tata McGraw-Hill, 2nd edition
- 3) Electrical & Electronic Measurements & Instrumentation, A.K. Sawhney, 19th revised edition
- 4) Instrumentation- Devices and Systems, Rangan, Sarma, and Mani, Tata-McGraw Hill 2nd edition
- 5) Electronic Instrumentation, H. S Kalsi, McGraw Hill, 4th edition
- 6) Measurement & Instrumentation, DVS Murthy, PHI
- 7) Sensors and Transducers, D. Patranabis, PHI, 2nd edition
- 8) Introduction to Measurements and Instrumentation, Arun K. Ghosh, PHI, 4th edition
- 9) Digital Logic and Computer Design, M Mano PHI, New Delhi.
- 10) Fundamentals of Digital Circuits, A Anand Kumar, PHI, New Delhi.
- 11) Digital Principles and Application, Malvino Leach, TMH, New Delhi.
- 12) Principles of Digital Electronics by K Meena, PHI, New Delhi.
- 13) Digital Systems: Principles and Application, by Tocci and Widmer, PHI

#### Experiments/ Laboratory work :

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

#### List of Experiments/Practical:

- 1) Measurement of displacement using LVDT.
- 2) Measurement using load cells.
- 3) Measurement using capacitive transducer.
- 4) Measurement using inductive transducer
- 5) Measurement of pressure, strain and torque using strain gauge. 2. Measurement of speed using Electromagnetic transducer. 3. Measurement of speed using photoelectric transducers
- 6) Measurement of angular displacement using Potentiometer.
- 7) Study of basic logic gates.
- 8) Study of Universal logic gates.
- 9) Realization of basic logic gates using universal logic gates.
- 10) Study of XOR and XNOR gates.
- 11) Study of Half adder
- 12) Study of Full adder.
- 13) Study of Half subtractor
- 14) Study Multiplexer and Demultiplexer

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-2  
(With Effect From June 2023)

Title of the Paper Inter/Multidisciplinary Course: Programing Language for Microcontroller  
(Credits: Theory-02, Practicals-02 i.e. 4 hours per week)

#### Unit – 1 Introduction

Variables and constants in C, Rules for construction of variables and constants, C keywords, Data types in C, integers and chars; signed-unsigned, floats-doubles, storage of data types, Operators and its hierarchy, type conversion, Loop and decision Control structures like if, if-else, else-if, While, For, Do-while, Switch case structure.

#### Unit – II Functions, Pointers and Array

Importance of Functions, Functions and Pointers, passing values between functions, scope of functions and Calling convention, Call by Value and Call by Reference, Recursion function

Array and String One and two dimension Arrays initialization, passing array elements to a function, passing an entire array to a function, pointers and arrays, arrays of pointers, pointers and strings, standard string function library. Two dimensional arrays of characters, arrays of pointers to strings.

#### Recommended List of Books:

- 1) Let us C, Y. Kanetkar, 9th Ed, BPB Publication
- 2) Programing in ANSI C by E Balaguruswamy 6<sup>th</sup>Ed TMH
- 3) Programing in C S G Kochan, 5<sup>th</sup>Ed, Pearson

Experiments/ Laboratory work :

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

List of Experiments/Practical:

1. Write a program to find out given year is a leap year or not
2. Write a program to find out largest/smallest digit in a given integer.
3. Write a program to add digits of a five digit number.
4. Write a program to check given number is prime or not and add first n prime number.
5. Write a program to find factorial of a number and print.
6. Write a program to add first n odd/even numbers.
7. Write a program to generate pattern.
8. Write a program to print sum of any 10 numbers using 1-D array.
9. Write a program to sort given array in ascending/descending order
10. Write a program to find a string length

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-2  
(With Effect From June 2023)

Title of the Paper Inter/Multidisciplinary Course: Introduction to Python Programing  
(Credits: Theory-02, Practicals-02 i.e. 4 hours per week)

Unit 1: Introduction and syntax of Python program :

Features of Python: Interactive, Object-oriented, Interpreted, Platform independent

Python building Blocks: How to Run Python, Identifiers, Keywords, Reserved Keywords, Indentation, Variables, Comments in Python, Indentation in Python, Multiline Statements, Import Functions (Displaying the output, Reading the input, import function), Input, Output and Operators (Arithmetic, Comparison, Assignment, Bitwise, Logical, Membership, Identity), operator precedence

Python environment setup: Installation and working of Python IDE, Running sample script to display some messages, Python Data Types/Structures: Numbers, Strings, Tuples, Lists, Dictionary some examples

Python Operators and Flow Control

Data type conversion, Decision Making (if, for, while, nested loops, control statements, types of loops), Basic Operators: Arithmetic, Comparison/ Relation, Assignment, Logical, Bitwise etc... Python Operator Precedence, Flow Control: Conditional Statement (if, if ... else, nested if), Looping While loop, for loop, nested loops. Loop manipulation using continue, pass, break, else

Unit II Data Structure, Functions, Array & Matrices :

Data Structures

Lists: Defining lists, accessing, deleting and updating values of list, basic operation on lists, built in list functions

The NumPy Module, Creating Arrays and Matrices, `arange(start, stop, step, dtype = None)`, `linspace(start, stop, number of elements)`, `zeros(shape, datatype)`, `ones(shape, datatype)`, `random.random(shape)`, `reshape(array, newshape)`

Tuples: Accessing, deleting, updating tuples, basic tuple operations, built in functions

Dictionaries: accessing, deleting, updating values of dictionaries, operations and built in functions, Function Definition, Function Calling, Function Arguments (Required Arguments, Keyword Arguments, Default Arguments, Variable Length Arguments), Anonymous Functions (Lambda Functions), Recursive Functions, Function with more than one return value, Accessing and using built in functions like type/ data conversion, math etc

#### RECOMMENDED BOOKS:

- 1) Python Programming, Rao K. Nageswar and SaikhAbrar, Scitech Publications (India) Pvt. Ltd
- 2) Learning Python 5<sup>th</sup> Edition, Lutz, Mark , O'Reilly Publications
- 3) Python Essential Reference, Beazley, David, Addison-Wesley Professional
- 4) Head First Python 2<sup>nd</sup> Edition, Paul, Barry, O'Reilly Publications
- 5) Yates, J., 2016. Python: Practical Python Programming for Beginners and Experts (Beginner Guide).
- 6) Sanders, E., 2016. Python: The Python Quickstart Guide-The Ultimate Guide to Python Programming. CreateSpace Independent Publishing Platform.
- 7) Tale, S., 2016. Python: The Ultimate Beginners Guide Start Coding Today. CreateSpace Independent Publishing Platform.
- 8) Dawson, M., 2010. Python Programming for the Absolute Beginner 3e. Nelson Education.
- 9) Ashok NamdevKamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python" ,Mc-Graw Hill Education,2018.
- 10) Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016
- 11) Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012

#### Experiments/ Laboratory work :

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

#### List of Experiments/Practical:

1. Write a Python program which accepts the radius of a circle from the user and compute the area.
2. Write a Python program to test whether a number is within 100 of 1000 or 2000.
3. Write a Python program to find whether a given number (accept from the user) is even or odd, print out an appropriate message to the user.
4. Write a Python program to test whether a passed letter is a vowel or not.
5. Write a Python program to sum of three given integers. However, if two values are equal sum will be zero.
6. Write a Python program that will return true if the two given integer values are equal or their sum or difference is 5.

7. Write a Python program to display your details like name, age, address in three different lines.
8. Write a Python program to compute the future value of a specified principal amount, rate of interest, and a number of years.
9. Write a Python program to convert the distance (in feet) to inches, yards, and miles.
10. Write a Python program to convert height (in feet and inches) to centimetres.
11. Write a python program to sum of the first n positive integers.
12. Write a Python program to calculate body mass index.

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NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-2  
(With Effect From June 2023)

Title of the Paper Inter/Multidisciplinary Course : Combinational Circuit Design  
(Total Credit 4 : Theory-02, Practicals-02 i.e. 4 hours per week)

Unit – I Combinational Circuits Design :

Combinational Logic Analysis and Design: Standard representation of logic functions (SOP and POS), K Maps & its application in Circuits Design, Mean term and max term in Boolean expression, introduction of K map, drawing k map for 3 variable and 4 variable expressions, pairs, quads, octet in K map, reduction of Boolean expression using K map, Don't care problems and concept of redundant groups, various design examples (Half adder, full adder, half subtractor, full subtractor, Code Converter, BCD Adder)

Unit – II Sequential Logic Design

Sequential logic design: Latches and Flip flops, Counters and Registers, Flip-flop as memory element, concept of timing-clock in flip-flop, design construction and operation of RS,Clocked RS, D, JK, T, and Master-Slave JK flip-flops, various triggering methods of flip-flop, application of flip-flop to counters, synchronous asynchronous counters, various types of counters (Binary, ripple, up, down, ring , Decade, modulus) Registers, various types of shift registers and its operations (SISO, SIPO, PIPO, PISO, Left-shift register Universal Shift register), concept of various memory chips.

RECOMMENDED BOOKS :

- 1) Digital Logic and Computer Design, M Mano, PHI, New Delhi.
- 2) Fundamentals of Digital Circuits, AAnand Kumar, PHI, New Delhi.
- 3) Digital Principles and Application, Malvino Leach, TMH, New Delhi.
- 4) Principles of Digital Electronics by K Meena, PHI, New Delhi.
- 5) Digital Systems: Principles and Application, by Tocci and Widmer, PHI

Experiments/ Laboratory work :

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

List of Experiments/Practical:

- 1) Study of D Flip-flop
- 2) Study of RS flip-flop.
- 3) Study of JK flip-flop.
- 4) Study of 4-bit up counter
- 5) Study of 4-bit down counter
- 6) Study of decade counter
- 7) Design, built and test Code Converter Circuit (Binary to Gray and Gray to Binary).
- 8) Design, build and test Half adder
- 9) Design, build and test Full adder.
- 10) Design, build and test Half subtractor
- 11) Design, build and test Full subtractor circuits.
- 12) Design, build and test 4-bit parallel adder circuit.

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NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-2

(With Effect From June 2023)

Title of the Inter/Multidisciplinary Course : Basics of Networking  
(Total Credit 4 : Theory-02, Practicals-02 i.e. 4 hours per week)

#### Unit – I Introduction to LAN

Basic LAN terminology, standards, operation and topology, Network architecture and protocols; Network architecture concepts, Basic concepts of layering, Layers of the OSI Model: application layer, presentation layer, session layer, transport layer, network layer, data link layer, transport layer, Internet layer.

#### Unit – II Data Communication and access technique

Basic concepts, signal encoding techniques, error detection, error correction, data link control. Performance measures and notation, ALOHA; pure ALOHA, slotted ALOHA, carrier sense multiple access; non persistent CSMA, slotted non-persistence CSMA, 1-persistence CSMA, n-persistence CSMA, CSMA with collision detection, control access schemes, polling, token passing, switched access methods. Standard Ethernet, fast Ethernet, its architecture, physical media for 100-Base-T, data encoding for fast Ethernet, network spans using 100-Base-T, Switched Ethernet, Gigabit Ethernet; its architecture, general functions, transmission media, gigabit Ethernet encoding schemes.

Token Passing LAN, token-ring operation, IEEE-802.5 frame structure, ring configurations, ring management, token-ring performance analysis, dedicated rings, high-speed token rings, FDDI and CDDI; FDDI MAC layer, FDDI Access methods, FDDI physical layer, station management, CDDI/TP-PMD.

#### Recommended List of Books:

- 1) Forouzen, TCP/IP Protocol Suit, TMH, New Delhi
- 2) William Stallings, Data and Computer Communications,
- 3) Gerd Keiser, Local Area Networks, THM, New Delhi
- 4) M A Miller, LAN Troubleshooting Handbook, BPB Publications, New Delhi
- 5) Tanenbaum, Computer Networks, PHI, New Delhi
- 6) Barry Nawce, Introduction to Networking, Prentice Hall

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. Write specifications of latest desktops and laptops.
2. Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.
3. Familiarization with Transmission media and Tools: Co-axial cable, UTP Cable, Crimping Tool, Connectors etc.
4. Preparing straight and cross cables.
5. Study of various LAN topologies and their creation using network devices, cables and computers.
6. Configuration of TCP/IP Protocols in Windows and Linux.
7. Implementation of file and printer sharing.
8. Designing and implementing Class A, B, C Networks
9. Subnet planning and its implementation
10. Installation of ftp server and client

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-2  
(With Effect From June 2023)

Title of the Inter/Multidisciplinary Course : Introduction to Microprocessor 8085A  
(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, 2<sup>nd</sup> Ed, PHI, New Delhi
- 3) The 8085 Microprocessor 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, 8080 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-bits
4. Shifting and Mask-off certain bits
5. To find Largest number and Smallest number from a three data and data array
6. To arrange data in ascending and descending order with concept of subroutine
7. Movement of data block and exchange of data block from one memory location to other
8. Binary up/down counter with appropriate delay
9. Decimal up/down counter with appropriate delay
10. Delay subroutine using one/two registers
11. Blinking an LED
12. Detecting a KEY

(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.)

NEP-2020 : Syllabus for F Y B Sc Inter/Multidisciplinary Course Semester-2  
(With Effect From June 2023)

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

Unit – I Flow Measurement

Flow Measurement: Introduction, definitions and units, classification of flow meters, Mechanical type flow meters -Theory of fixed restriction variable head type flow meters – orifice plate – venturi tube – flow nozzle – dall tube – installation of head flow meters Quantity meters, area flow meters and mass flow meters-Positive displacement flow meters – constructional details and theory of operation of mutating disc, reciprocation piston, oval gear and helix type flow meters – inferential meter – turbine flow meter – rota meter –thermal mass flow meter – volume flow meter plus density measurement

Unit – II Transducers

Transducers - Classification, Active, Passive, Mechanical, Electrical, their comparison. Selection of Transducers: Desirable characteristics of transducers . Principle and working of following types: Displacement transducers - Resistive (Potentiometric, 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).

RECOMMENDED BOOKS :

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

Experiments/ Laboratory work :

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

List of Experiments/Practical:

- 1) Measurement of displacement using LVDT.
- 2) Measurement using load cells.
- 3) Measurement using capacitive transducer.
- 4) Measurement using inductive transducer
- 5) Measurement of pressure, strain and torque using strain gauge.
- 6) Measurement of speed using Electromagnetic transducer.
- 7) Measurement of speed using photoelectric transducers
- 8) Measurement of angular displacement using Potentiometer.

Veer Narmad South Gujarat University, Surat

NEP-2020 : Syllabus for F Y B Sc Skill Development/Enhancement Course Semester-2  
(With Effect From June 2023)

Title of the Paper Skill Development/Enhancement Course: Introduction to Arduino

(Total Credits 2 : Theory-01, Practicals-01 i.e. 2 hours per week)

Unit - I

Understanding the Arduino framework: Hardware description, concept of input and output in microcontroller, Difference between Analog and Digital, interfacing pins description, Understanding the digital input and output, Understanding the analog input

Unit II

Understanding the Arduino IDE (Integrated Development Environment): The programming language "C" for Arduino, compiling and uploading sketch (programs), configuring reading and writing on the digital pins, reading the analog pins, transferring the data to the host computer, manipulation of data (arithmetic & logic)

The If statement, do and do.....while, for, while control statements.

List of Practical

1. Downloading the Arduino IDE and installing on the computer
2. Blink LED program
3. Blink multiple LEDs with different sequence
4. Reading status of key and control the LED
5. Serial interfacing with the host computer
6. Reading the Analog input signal
7. Implementing a voltmeter
8. Generating Square waves
9. Controlling pulse width with potentiometer

References:

Arduino website <https://www.arduino.cc/reference/en/>