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**VEER NARMAD SOUTH GUJARAT UNIVERSITY**

University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.

**વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી**

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

Tel. +91 - 261 - 2227141 to 2227146, Toll Free: 1800 2333 011, Fax: +91 - 261 - 2227147  
E-mail: info@vnsgu.ac.in, Website: www.vnsgu.ac.in

### **-: પરિપત્ર :-**

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન સ્નાતક કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૧૯-૨૦ થી અમલમાં આવનાર T.Y.B.Sc.(Electronics) Sem-V & VI નો અભ્યાસક્રમ અંગે ભૌતિકશાસ્ત્ર વિષયની અભ્યાસસમિતિની તા.૩૦/૦૪/૨૦૧૯ની સભાનાં ઠરાવ ક્રમાંક: ૩ અન્વયે કરેલ નીચેની ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૫/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક : ૩૩ અન્વયે સ્વીકારી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલએ તેની તા.૦૭/૬/૨૦૧૯ની સભાના ઠરાવ ક્રમાંક: ૬૦ અન્વયે સ્વીકારી મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્દુપરાંત તેનો અમલ કરવો.

**ભૌતિક શાસ્ત્ર વિષયની અભ્યાસસમિતિની તા.૩૦/૦૪/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક: ૩**

:: આથી ઠરાવવામાં આવે છે કે, પેટાસમિતિએ તૈયાર કરેલ T.Y.B.Sc.(Electronics) Sem- V & VI નો શૈક્ષણિક વર્ષ ૨૦૧૯-૨૦ થી અમલમાં આવનાર અભ્યાસક્રમ સર્વાનુમતે મંજૂર કરી તે મંજૂર કરવા વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

**વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૫/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક : ૩૩**

:: આથી ઠરાવવામાં આવે છે કે, પેટાસમિતિએ તૈયાર કરેલ T.Y.B.Sc.(Electronics) Sem- V & VI નો શૈક્ષણિક વર્ષ ૨૦૧૯-૨૦ થી અમલમાં આવનાર અભ્યાસક્રમ સ્વીકારી તે મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

**એકેડેમિક કાઉન્સિલની તા.૦૭/૦૬/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક: ૬૦**

:: આથી ઠરાવવામાં આવે છે કે, વિજ્ઞાન વિદ્યાશાખાએ તેની તા. ૦૨/૦૫/૨૦૧૯ ની સભાના ઠરાવ ક્રમાંક : ૩૩ અન્વયે ભલામણ કરેલ શૈક્ષણિક વર્ષ ૨૦૧૯-૨૦ થી અમલમાં આવનાર T.Y.B.Sc.(Electronics) Sem-V & VI નો અભ્યાસક્રમ સ્વીકારી મંજૂર કરવામાં આવે છે.

બિડાણ: ઉપર મુજબ

ક્રમાંક : એકે./પરિપત્ર/૧૦૩૬૨/૧૯

તા. ૨૦-૦૬-૨૦૧૯

ઈ.ચા. કુલસચિવ

પ્રતિ,

- ૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન સ્નાતક કોલેજોના આચાર્યશ્રીઓ.
- ૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા
- ૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

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**Veer Narmad South Gujarat University, Surat**  
**Syllabus for T Y B Sc (Electronics) w.e.f. June 2019**

**SEMESTER V: Paper VI**  
**Theory of operational amplifier**

**Unit 1: Differential amplifier**

Differential amplifier circuit configurations, Dual input balanced output Differential amplifier, Dual input unbalanced output Differential amplifier, FET Differential amplifier, Constant current bias, Current mirror, cascaded Differential amplifier stages, level translator, examples of designing and analysis

**Unit 2: Introduction to operational amplifier**

Block diagram, equivalent circuit and schematic symbol of typical operational amplifier, ideal op amp, ideal voltage transfer curve, Open loop op-amp configurations, Voltage series feedback amplifier, voltage shunt feedback amplifier, Differential amplifier with one op-amp, two op-amp and three op-amps, examples of designing and analysis.

**Unit 3 : Practical operational amplifier**

Input offset voltage, offset voltage compensating network design, input bias current, input offset current, Total output offset voltage, Thermal drift, error voltage, Noise, CMRR, examples of designing and analysis.

**Unit 4 : Linear applications of op-amp.**

Peaking amplifier, summing, scaling and averaging amplifiers, instrumentation amplifier and its applications, voltage to current converter and its applications, current to voltage converter, Integrator, differentiator, examples of designing and analysis

**Recommended List of Books:**

- 1) R A Gayakwad, Op-Amps and Linear Integrated Circuits, 2012, PHI, New Delhi
- 2) P R Gray and R G Meyer, Analysis and Design of Integrated Circuits, 6<sup>th</sup> Ed John Wiley & Sons
- 3) R F Coughlin and A F F Driscoll, Operational Amplifiers and Linear Integrated Circuits, 2000, PHI, New Delhi

**List of Experiments/Practicals/Laboratory work for Paper VI**

1. Study of FET differential amplifier
2. Study of Non- inverting amplifier with PSpice simulation
3. Study of inverting amplifier with PSpice simulation
4. Study of instrumentation amplifier
5. Study of Integrator
6. Study of differentiator

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**Proposed Syllabus for T Y B Sc (Electronics) w.e.f June 2019**

**SEMESTER V : Paper VII**  
**Analog Communication**

**Unit 1: Introduction**

Communication system, Modulation, External Noise, Internal Noise, Signal to noise ratio, Analog and digital signals

Introduction of Antenna, Radiation pattern of an Antenna, Antenna parameters and their definitions, Parasitic Arrays, Horn antennas

**Unit 2: Transmission Lines, Wave Propagation and Radiations**

Fundamentals of Transmission Line, characteristic impedance, Losses in transmission lines, Standing Waves, Quarter- and Half-wavelength lines

Electromagnetic Radiation, Types of Radio waves Propagation, Ground Wave propagation, Sky Wave Propagation, Troposphere or Space Wave Propagation, Troposphere Scattering.

**Unit 3: Amplitude Modulation**

Theory of AM, A M Generation, Doubled Sideband Suppressed Carrier Modulation, Description of SSB, carrier Suppression, Unwanted Sideband Suppression,

Demodulation of AM, Envelope Detection, Principal of Demodulation of SSB

**Unit 4: Angle Modulation: FM And PM**

Frequency & Phase Modulation Theory, Frequency Modulation Bandwidth, Phase Modulation, Generation of Frequency Modulation, FM Demodulation: AM-Based Method, Detection of Phase Modulation

**Recommended List of Books :**

1) Electronic Communication: Analog, Digital and Wireless - Sanjeev Gupta, 3rd Ed, Khanna Publication

2) Electronic Communication Systems - Kennedy, Davis 4th Ed., TMH

3) Electronic Communications - Dennis Roddy, John Coolen, 6<sup>th</sup> Ed,

4) Electronics and communication technology - J S Katre , 2012 Ed, Tech -Max Publication

5) Electronics & Radio Engineering – Terman – 4th Ed, Mc Graw Hill

6) Communication Systems – Simon Haykin , 3rd Ed, John Willy & Sons Inc

7) Electronics & Radio Engineering – M. L . Gupta , 9th Edition, Dhanpat Rai publication

**List of Experiments/Practicals/Laboratory work for Paper VII**

1. Study of AM

2. Study of Amplitude Demodulation

3. Study of FM

4. Study of Frequency Demodulation

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**SEMESTER V: Paper VIII**  
**Introduction to Microcontrollers**

**Unit 1: Architecture**

Block diagram of Microcontroller – Comparison with Microprocessor and Microcontroller – Pin details of 8051 – ALU – Special function registers – ROM – RAM – RAM Memory Map (including registers and register banks) – Program Counter – PSW register – Stack - I/O Ports – Timer Interrupt – Serial Port – External memory – Clock – Reset – Clock Cycle – Machine Cycle – Instruction cycle – Instruction fetching and execution -Overview of 8051 family.

**Unit 2: Instruction Set**

Assembling and running an 8051 program – Instruction set of 8051 – Data transfer instructions – Different addressing modes – Arithmetic Instructions – Signed number concepts and arithmetic operations – Logic and Compare instructions – Rotate instruction and data serialization – BCD, ASCII Loop and jump instructions – Call instructions – Time delay routines – Program control – Assembler directives – Sample programs.

**Unit 3: Bit Manipulation and Branch**

Loop and jump instructions – Call instructions – Time delay routines – Program control – Assembler directives – Sample programs. I/O operations and related instructions – Bit addresses for I/O and RAM – I/O programming – I/O bit manipulation programming

**Unit 4: Interface and Interrupt**

Programming 8051 Timers – Counter programming – Basics of Serial programming – 8051 connection to RS 232 – 8051 Serial Port Programming – 8051 interrupt – Programming Timer Interrupt – Programming external hardware interrupts – Programming the serial communication interrupt – Interrupt priority in 8051.

**Recommended List of Books:**

1. 8051 Microcontroller by Kenneth J. Ayala, 4<sup>th</sup> Ed, PHI
2. Microprocessor and Microcontroller by R. Theagarajan, 6<sup>th</sup> Ed, Sci Tech Publication, Chennai
3. 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi, Mazidi and D. MacKinlay, 2006, Pearson Education Low Price Edition.
4. Programming customizing the 8051 Microcontroller by Myke Predko, 5<sup>th</sup> Ed, Tata McGraw Hill

**List of Experiments/Practicals/Laboratory work for Paper VIII**

1. Getting started with the 8051 – reading and writing ports
2. Writing a Delay
3. Turning on an LED
4. Blink an LED Without using the delay() Function
5. Using a Button
6. De-bouncing a Button
7. ASCII to packed BCD
8. BCD to ASCII

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**SEMESTER V: Paper IX**  
**Basic Measurement System**

**Unit 1: Measurements Systems**

Functional element of instrumentation, examples, (pressure gauge, and Bourdon types thermometer), Input output configuration, schematics, examples, methods of corrections, high gain feedback, opposing input and signal filtering, examples.

**Unit 2: Measurement Characteristics**

Static characteristics (Accuracy and precision, Resolution, Threshold, Linearity, hysteresis, sensitivity, etc), Errors and its types, absolute and relative, Gross, systematic and random errors, Methods of correction, Statistical analysis, Gaussian error distribution curve, probable error.

**Unit 3: Analysis of measurement System**

Dynamic characteristics, speed of response, time lag, input impedance and stiffness, generalized mathematical model of measurement systems, operational transfer function, sinusoidal transfer function, zero, first, and second order measurement systems, step, ramp, and frequency response of first order system, step response of second order system

**Unit 4: Pressure, Flow and Electrical Measurements**

Pressure measurement, elastic elements, Bourdon tubes, Diaphragm and Bellow gauges, electrical methods, strain gauge, potentiometer etc. variable capacitance types, LVDT

Flow measurement:

Introduction, classification of flow methods, electrical methods, M flow meter, Ultrasonic flow meter, laser anemometer

Electrical Measurements: Construction and working of Galvanometer, PMMC, D'Arsonval meter, Conversion into ammeter and voltmeter, Range selection. C bridges, General equation of A C Bridge, Comparison, Measurement of inductance and capacitance, Desauty, Schearing, Maxwell and Wein's bridge, Own's Bridge and Anderson's Bridge.

**Recommended List of Books :**

1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4<sup>th</sup> Ed, PHI, New Delhi.
2. B E Jones, Instrumentation, Measurements, and Magnitudes, 3<sup>rd</sup> Ed, THM, New Delhi.
3. D S Sonde, Monographs with Solid State Electronic Instrumentation Vol-I to IV, 4<sup>th</sup> Ed, THM, New Delhi.
4. E O Dohelin, Measurement Systems, 3<sup>rd</sup> Ed, McGraw Hill

**List of Experiments/Practicals/Laboratory work for Paper IX**

1. Maxwell Bridge
2. Schearing Bridge
3. Weins Bridge
4. Thermistor as a Temperature Transducer
5. Gaussian Error distribution curve
6. Kelvin's Bridge
7. Own's/Anderson's Bridge

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**SEMESTER V: Paper X**  
**Industrial Instrumentation**

**Unit 1: Temperature and Force Sensor**

Temperature scales, International Practical temperature scale, Electrical, Non-electrical, and radiation methods, Balance, Hydraulic Cell, Pneumatic Cell, Elastic Force Devices, Separation of force Components and Calibration,

**Unit 2: Transducers**

Types, classifications and selection of transducers, Resistive transducers, strain gauge, theory, gauge factor, semiconductors strain gauge, application, capacitive transducers, types, variable area, distance and dielectric type, differential arrangement, inductive transducers, principle and working, temperature measurement, electrical methods, thermistor characteristics and application.

**Unit 3: Analytical Instruments**

Absorption Spectroscopy and laws of radiation absorption, Single-beam, dual-beam photometers, Probe type photometer, Single-beam, dual-beam spectrophotometers, Dual wavelength and scanning spectrophotometers,

**Unit 4 : Data Acquisition and Processing**

General data acquisition system, Signal conditioning, data transmission, A-to-D and D-to-A conversion, Data storage and display,

**Recommended List of Books :**

1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4<sup>th</sup> Ed, PHI, New Delhi.
2. B E Jones, Instrumentation, Measurements, and Magnitudes, 6<sup>th</sup> Ed, THM, New Delhi.
3. D S Sonde, Monographs with Solid State Electronic Instrumentation Vol-I to IV, 4<sup>th</sup> Ed, TMH New Delhi.
4. E O Doblin, Measurement Systems, 3<sup>rd</sup> Ed, McGraw Hill

**List of Experiments/Practicals/Laboratory work for Paper X**

1. Time constant of first order system (RC Circuit)
2. Frequency response of first order system
3. Potentiometer / strain gauge as pressure measuring device
4. LVDT Characteristics

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**SEMESTER V: Paper XI**  
**Programming Language for Microcontroller**

**Unit 1: Loop and Control structures**

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 2: Functions and Pointers**

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

**Unit 3: 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

**Unit 4: Structure**

Importance of Structure, Declaring a Structure, Accessing and storing of Structure elements, Array of Structure, passing Structure variable to function, Structure pointer, nesting of Structure

**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

**List of Experiments/Practicals/Laboratory work for Paper XI**

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

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**SEMESTER VI : Paper VI**  
**Linear Integrated Systems**

**Unit 1: Frequency response of op-amp**

Frequency response, Frequency response of internally compensated op-amps, high frequency op amp equivalent circuit, open loop voltage gain as a function of frequency, closed loop Frequency response, circuit stability, slew rate, Problems.

**Unit 2: Active filters**

Active filters, First order low-pass Butterworth filter, Second order low-pass Butterworth filter, First order high-pass Butterworth filter, Second order high-pass Butterworth filter, higher order filters, Band pass filters, Band reject filters, All pass filters,

**Unit 3: Oscillators**

Oscillators, Barkhausen criteria for oscillation, classification of oscillators, Phase shift oscillator, Wien bridge oscillator, Square wave generator, Triangular wave generator, Saw tooth wave generator, VCO, PSpice simulation and design problems

**Unit 4: Comparators and converters**

Basic Comparator, Zero crossing detector, Schmitt trigger, Comparator characteristics, limitations of op-amp as Comparator, voltage limiters, analog-to-digital and digital –to-analog converters, clippers and clampers, absolute value output circuit, peak detector, sample and hold circuit, 555 timer IC and its applications, 565 PLL IC and its applications, PSpice simulation and design problems

Recommended List of Books :

- 1) R A Gayakwad, Op-Amps and Linear Integrated Circuits, 2012, PHI, New Delhi
- 2) P R Gray and R G Meyer, Analysis and Design of Integrated Circuits, 6<sup>th</sup> Ed, John Wiley & Sons
- 3) R F Coughlin and A F F Driscoll, Operational Amplifiers and Linear Integrated Circuits, 2000, PHI, New Delhi

**List of Experiments/Practicals/Laboratory work for Paper VI**

1. Study of slew rate and CMRR of an op-amp
2. Study of active filters
3. Study of RC oscillators using op-amp
4. Study of comparator and Zero crossing detector
5. Study of 741 as an astable multivibrator
6. Study of IC555 as an astable multivibrator
7. Study of IC555 as a monostable multivibrator



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**SEMESTER VI : Paper VII**  
**Advance Communication Systems**

**Unit 1: Digital Communication**

Introduction, Pulse modulation, PCM, PCM Sampling, Signal to Quantization Noise Ratio, Linear Versus Non Linear PCM Codes, Ideal Channel Noise, Coding methods, Companding

**Unit 2: Fibre Optics**

Introduction, Basic Fibre Optic System, Physical Description, Theory of optical fiber, dispersion, losses in fibre, optical transmitters, Receiver, Fibre Optic Cable: Splices, Connectors and couplers

**Unit 3: Wireless Communication System**

Introduction, Wireless Application And Services, Features Of Wireless Communication System, Mobile Phone, Cellular Technology Concept, 1G,2G,2.5G,3G Cellular System, Multiple Access Techniques: FDMA, TDMA, CDMA

**Unit 4: Satellite Communication System**

Introduction, Kepler's law, Satellite Orbits: Satellite Elevation Categories, Satellite Orbital Patterns, Geosynchronous Satellites: Geosynchronous Satellite, Orbital Velocity, Round-Trip Time Delay of Geosynchronous Satellites, Clarke Orbit, Advantages and Disadvantages of Geosynchronous Satellites, Antenna Look Angles: Angle of Elevation, Azimuth Angle, Limits of Visibility

**Recommended List of Books :**

- 1) Electronic Communication : Analog , Digital and Wireless - Sanjeev Gupta, 3rdEd, Khanna Publication .
- 2) Electronic Communication Systems - Kennedy, Davis 4th Ed TMG
- 3) Monochrome and Colour Television by R R Gulati,2nd Ed, New Age International
- 4) Electronic Communications -Dennis Roddy , John Coolen, 3<sup>rd</sup> Ed, McGraw Hill
- 5) Electronics and communication technology - J S Katre ,2012 ed Tech -Max Pub
- 6) Electronics & Radio Engineering – Terman – 4th Ed, Mc Graw Hill
- 7) Communication Systems – Simon Haykin , 3rd Ed, John Willy & Sons Inc
- 8) Electronics & Radio Engineering – M. L . Gupta , 9th Ed, Dhanpat Rai Pub
- 9) Advance Electronics communication System by WAYNE TOMASI
- 10) Wireless Communication by U.S. Shah

**List of Experiments/Practicals/Laboratory work for Paper VII**

1. Study of TDM
2. Study of Sample and Hold circuit
3. Study of SHR
4. Study of Fibre optics Voice transmission
5. Study of bending loss in Fibre Optics System

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**SEMESTER VI: Paper VIII**  
**Microcontroller and Embedded System**

**Unit 1: Microcontroller Interface**

8051 interfacing to external memory – 8051 interfacing with the 8255 – interfacing a Relays and opto isolators – Sensors interfacing and signal conditioning – ADC interfacing – DAC interfacing - Seven segment and LCD display interfacing

**Unit 2: Introduction to Embedded C language**

Comparison of Assembly Language and “C”, Data types and time delay in 8051 C, I/O programming in 8051 C, Logic operations in 8051 C, Data conversion programs in 8051 C, Accessing code ROM space in 8051 C, Data serialization using 8051 C. Pin description of the 8051, Design and test of 8051 Minimum Module, Explaining the Intel hex file.

**Unit 3: Peripheral Interfacing using Embedded C**

Programming 8051 timers, Counter programming, Programming timers 0 and 1 in 8051 C. Basics of serial communication, 8051 connection to RS232, 8051 serial port programming in Assembly, Programming the second serial port, Serial port programming in C.

**Unit 4: Introduction to Arduino**

Understanding the Arduino framework, Hardware and interfacing pin descriptions, downloading and installing the IDE (integrated development environment), Arduino IDE and sketch overview, writing simple programs

**Recommended List of Books :**

1. 8051 Microcontroller by Kenneth J. Ayala, 4<sup>th</sup> Ed, PHI
2. Microprocessor and Microcontroller by R. Theagarajan, 6<sup>th</sup> Ed, Sci Tech Publication, Chennai
3. 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi, Mazidi and D. MacKinlay, 2006 Pearson Education Low Price Edition.
4. The 8051 Microcontroller and Embedded Systems using Assembly and C, by Kenneth J. Ayala and Dhananjay V Gadre
5. Programming customizing the 8051 Microcontroller by Myke Predko, 5<sup>th</sup> Ed, Tata McGraw Hill

**List of Experiments/Practicals/Laboratory work for Paper VIII**

1. Writing a delay without using delay function and with delay function
2. 7-segment LED (direct driven and decoded)
3. A/D conversion
4. Interfacing Keys
5. A/D conversion (may use a speaker to here different frequency using a speaker)
6. The LCD Display Interfacing
7. All the above practicals should be done using an Arduino also.

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**SEMESTER VI : Paper IX**  
**Electronic Instrumentation**

**Unit 1: Signal generators and Analysers**

Pulse and square wave generator, function generator, Random Noise generator, TV sweep generator, Marker generator, sweep mark generator, wave analyser, types, harmonics distortion analyser, spectrum analyser, basic spectrum analyser using SWEPT receiver design, RF spectrum analyser.

**Unit 2:**

Oscilloscope, CRT, basic CRO circuit, time base generator, free running mode, triggering mode, synchronization, delay line, CRO probes, special purpose CRO, digital storage Oscilloscope  
Analog multimeter, electronic analog multimeter, volt-ohm meter, FET input-volt meter, Micro volt meter, digit voltmeter, types (ramp type, integrating, etc) , digital frequency meter, electronic phase meter, digital multimeter

**Unit 3: Trouble shooting techniques**

Maintenance, need, common faults, corrective and preventive maintenance, methods of fault location, sequential and non-sequential checks, random check, half split, beginning to end technique

**Unit 4 : Basic of Biomedical Instrumentation**

Medical Instrumentation System, Constraints in design of medical instrumentation system, Origin of Bio-electric signals, Recording electrodes like EGC, PCG, EEG, EMG, Bio-feedback instrumentation, Bedside Patient monitoring systems, Heart rate maters, measurement of Pulse rate, Blood pressure measurement.

**Recommended List of Books :**

1. W D Cooper, Electronics Instrumentation and Measurement Techniques, 4<sup>th</sup> Ed, PHI, New Delhi.
2. B E Jones, Instrumentation, Measurements, and Magnitudes, 3<sup>rd</sup> Ed, TMH, New Delhi.
3. D S Sonde, Monographs with Solid Sate Electronic Instrumentation Vol-I to IV,4<sup>th</sup> Ed, THM, New Delhi.
4. E O Dobelin, Measurement Systems, 3<sup>rd</sup> Ed, McGraw Hill

**List of Experiments/Practicals/Laboratory work for Paper IX**

1. Generation of square wave and triangular wave
2. Lissagus figure
3. Study of digital storage oscilloscope

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**SEMESTER VI : Paper X**  
**Applications of Communication Systems**

**Unit 1: Radio AM Receivers**

TRF Receivers, Super-heterodyne Receivers, AM Receivers:- Receiver Characteristics , Super-heterodyne Receiver, Tracking, Local Oscillator, Intermediate Frequencies and IF Amplifiers, Diode Detector, Automatic Gain Control, Automatic Frequency Control, Spurious response of Super-heterodyne Receiver.

**UNIT 2: Radio FM Receivers**

R F amplifier, Amplitude Limiting, Pre-Emphasis and De-emphasis, Effect of Noise on Amplitude and Frequency modulation, Alignment of F M receiver, FM Receiver performance, Transceivers, Basic FM demodulators, Ratio detector, FM demodulator comparison.

**Unit 3: Television Systems**

Elements of a television System, Composite Video Signal, Channel Bandwidth, Vestigial sideband Transmission, monochrome Picture tube, Beam Deflection, Videocon, Television Transmitter, Positive and Negative Modulation, receiver Section, Principle of Colour Television, luminance, Hue and Brightness, NTSC Colour TV System, PAL Colour TV System, SECAME System.

**UNIT 4: Radio Detection and Ranging (RADAR)**

Radar Fundamental, frequency selection for radar system, Basic Pulsed Radar System, Display Methods PPI (Plan Position Indicator) by RDF (Radio Direction Finding) & Scope Display, RADAR Range Equation, Limitation of RADAR, Types of RADAR: RADAR altimeter, RADAR Beacon, Interrogating RADAR, Ground Controlled approach RADAR, Instrument Landing System (ILS), VOR system, TACAN (Tactical Air Navigation) System, Radio Direction Finding (RDF)

**List of Experiments/Practicals/Laboratory work for Paper X**

- 1) Study of Super heterodyne receiver
- 2) Study of FM receiver
- 3) Study of Diode detector.

**Recommended List of Books :**

- 1) Advance Electronics communication System by WAYNE TOMASI Pearson/Prentice Hall, 2004
- 2) Electronics Devices and Circuits, Sanjeev Gupta
- 3) Electronic Communications, Dennis Roddy, John Coolen
- 4) Wireless Communication, U.S. Shah
- 5) Digital communications – S.K. Venkata Ram 1st Ed, S. Chand
- 6) Understanding Fiber Optics - Jeff Hecht 2nd Ed SAMS Publication
- 7) Electronics & Radio Engineering – M.L . Gupta , 9th Ed, Dhanpat Rai Publication
- 8) Electronic Communication Systems, Kennedy, Davis
- 9) Monochrome and Colour Television, R R Gulati
- 10) Communication Electronics, N.D Deshpande, D.A Deshpande, P. K RangolePubliction byTATA McGraw Hill

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**SEMESTER VI : Paper XI**  
**Simulation using MATLAB**

**Unit 1: Introduction to MATLAB**

Introduction to MATLAB, overview, starting MATLAB Session, understanding the MATLAB desktop and its environment, quitting the MATLAB session

**Unit 2: MATLAB Constructs**

Elementary MATLAB Constructs, MATLAB Variables, Arithmetic Operations, Logical and Relational Operations, Mathematical Functions, Graphical Functions, I/O Operations,

**Unit 3: MATLAB Programming**

Elementary Matrix Manipulations MATLAB Programming, MATLAB Procedures, MATLAB Functions, MATLAB Language  
Constructs, Function Handles, Solution of Differential Equations

**Unit 4: Simulink**

SIMULINK, Operating Principle and Management of Simulink, Constructing a Simulink Block Diagram, Parametrizing Simulink Blocks, Simulink Simulation, Solving Differential Equations with Simulink, Simplification of Simulink Systems, the Function Block, Construction of Subsystems, Interaction with MATLAB, Simulations in MATLAB, Transfer of Variables through Global Variables, Dealing with Characteristic Curves

**Recommended List of Books :**

1. Y Kirani Singh & B B Chaudhuri, MATLAB Programming, 5<sup>th</sup> Ed, PHI, New Delhi
2. Rudra Pratap , Getting Started with MATLAB 7, 3<sup>rd</sup> Ed, Oxford University Press (Indian Edition).
3. Steven T. Karris, Signals and Systems with MATLAB ® Computing and Simulink ® Modeling, 4<sup>th</sup> edition, 2008, Orchard Publications
4. B. Hunt, R. Lipsman, J. Rosenberg, K. Coombes, J. Osborn, G. Stuck A Guide to MATLAB for Beginners and Experienced users, Cambridge University Press, 2001.
5. Andrew Knight, CHAPMAN & HALL/CRC Andrew Knight , BASICS OF MATLAB® and Beyond
6. INTRODUCTION TO MATLAB® & SIMULINK *A Project Approach*, Third Edition  
O. BEUCHER and M. WEEKS

**List of Experiments/Practicals/Laboratory work for Paper XI**

1. Hands on with MATLAB (Data type operators writing of simple equations etc.)
2. Vectors and Matrices

3. Vectors and matrix operations
4. Simulation:
  - a. To create arrays and vectors and perform arithmetic and trigonometric operations on them.
  - b. To make simple 2-D plot in MATLAB
  - c. To create script files and execute them in MATLAB
  - d. To learn difference between a script file and a function file and execute a function file.
  - e. Array and matrix simple computation and manipulation.
  - f. To define and use anonymous functions in command-line computation.
  - g. To learn and do simple symbolic algebra in MATLAB.
  - h. To read data from common data files into MATLAB workspace and save data into a MATLAB readable file.
  - i. Publish report

### **Laboratory/Experimental Work**

There shall be 6 practical / Experimental works each of three hours duration per week per batch in semester 5 and 6. Since the inception of the course, the batch size is of 10 students per batch which shall continue. The project work shall be considered as part of laboratory/experimental work and will be compulsory for a student to complete in the semester. During semester 5 there shall be assessment of Design, Analysis, synopsis and Documentation and Fabrication, Testing, Working and Implementation shall be examined in Semester 6. The project work shall be equivalent to 3 practical per week.