CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY, BHILAI

SCHEME OF TEACHING AND EXAMINATION

BE (Applied Electronics & Instrumentation Engineering) IV Semester

S. No.	Board of Studies	Subject Code	Subject Name	Periods Per Week			Scheme of Exam. (Theory/ Practical)			Total Marks	Credit L+(T+P)/2
				L	T	P	ESE	CT	TA		
1	Applied Mathematics	312451(14)	Mathematics - IV	3	1	-	80	20	20	120	4
2	Electronics &Instrumentation	312452(27)	Applied Electronics	3	1	-	80	20	20	120	4
3	Electrical Engg.	312453(24)	Electrical Machines	3	1	-	80	20	20	120	4
4	Electronics & Instrumentation	312454(27)	Sensors & Transducers	3		-	80	20	20	120	3
5	Electronics & Telecomm.	312455(28)	Microprocessor & Interfaces	3	1	-	80	20	20	120	4
6	Electronics &Telecomm.	312456(28)	Signals & Systems	3	1	-	80	20	20	120	4
7	Applied Electronics & Instrumentation	312461(12)	Applied Electronics Laboratory	-	-	4	40	-	20	60	2
8	Applied Electronics &Instrumentation	312462(12)	Sensors & Transducers Laboratory	-	-	3	40	-	20	60	2
9	Applied Electronics & Instrumentation	312463(12)	Electronics Workshop	-	-	4	40	-	20	60	2
10	Applied Electronics & Instrumentation	312464(12)	Microprocessor & Interfaces Laboratory	-	-	4	40	-	20	60	2
11	Humanities	312465(46)	Health, Hygiene & Yoga	-	-	2	-	-	40	40	1
12			Library	-	-	1	-	-	-	-	-
			Total	**18**	**5**	**18**	**640**	**120**	**240**	**1000**	**32**

L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment

Note (1): Duration of all theory papers will be of Three Hours.

Note (2): Industrial Training of six weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV semester after which students have to submit a training report which will be evaluated by the college teachers during B.E. V semester.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Mathematics – IV**	Code:	**312451 (14)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To provide tools for studying electromagnetic waves, signal processing etc.
2. To use partial differential equations and study its considerable importance in modern communication technology, design of fibre transmission system
3. To describe initial and boundary value problems involving wave motions, transmission of signals along a cable.
4. Use Z- transform in digital signal processing, control theory, analysis of discrete time system, manipulation of discrete data sequences and to solve difference equations.

UNIT- I **SERIES SOLUTION OF DIFFERENTIAL EQUATIONS AND SPECIAL FUNCTIONS):** Series solution of differential equations, The method of Frobenius, Bessel's differential equation, Bessel's function of the First Kind - recurrence relations, generating function, orthogonality, Legendre's differential equation, Legendre's polynomial - Rodrigue's formula, generating function, recurrence relations, orthogonality.

UNIT-II **PARTIAL DIFFERENTIAL EQUATIONS:** Formation, Solution of Lagrange's linear differential equation, homogeneous linear differential equation with constant coefficients, non-homogeneous linear differential equations, Method of separation of variables.

UNIT- III **APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:** Initial & boundary value problems, Vibrations of a stretched string, D'Alembert's solution, Onedimensional heat flow, Transmission of signals along a cable - Telephone equation, Telegraph & radio equations, Vibrations of rectangular & circular membranes.

UNIT-IV **Z – TRANSFORM:** Sequence, Basic operations on sequences, Definition of Z- Transform, Linearity, Change of scale & shifting properties, Z-transform of standard sequences, Inverse Z- Transform, Multiplication by n & division by n, Initial value & final value theorems, Convolution of sequences, Convolution theorem, Inverse Z-transform by partial fraction, power series and residue methods. Application to solution of difference equations.

UNIT-V **RANDOM VARIABLE & PROBABILITY DISTRIBUTIONS:** Random variable, Discrete & continuous probability distributions, Mathematical Expectation, Mean & variance, Moments & moment generating function, Probability distributions -Binomial, Poisson & Normal distributions.

Text Books:

1. Higher Engg.Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg.Mathematics by Erwin Kreyszig – John Wiley & Sons.

Reference Books:

1. Advanced Engg.Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N.Wartikar& J.N. Wartikar.Vol- II– Pune VidyarthiGrihaPrakashan, Pune.
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

Course outcomes: Students will be able to

1. use special functions in communication system, non linear wave propagation, electromagnetic theory, signal processing etc.
2. know the importance of PDEs in modern communication technology and many numerical simulations.
3. solve wave equation, telephone equation, telegraph equation, radio equation and vibrations of membranes.
4. know the definition of Z- transform and can apply some of the most frequently occurring properties of Z- transform ,Use Z- transform in digital communication system, calculate Z- transform of some elementary signals and solve difference equation.
5. to study of about a quantity that may take any of given range of values that can't be predicted exactly but can be described in terms of their probability.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Applied Electronics**	Code:	**312452 (27)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To provide the basic analysis of transistor at low frequency & high frequency.
2. To lay the foundations of transistor amplifier, multistage amplifier, feedback amplifier.
3. To provide basic exposure to different type of oscillator.
4. To lay the foundations of power circuit & system.

UNIT- I **Transistor at Low Frequencies:** Graphical analysis of CE configuration, Two port devices and the hybrid model, Transistor hybrid model, H parameters, Conversion formulas for the parameters of the three transistor configuration, Analysis of a transistor amplifier circuit using H Parameters, Thevenin's and Norton's theorems and corollaries, Emitter follower, Comparison of transistor amplifier configuration, Linear analysis of a transistor circuit, Miller's theorem and its dual, Cascading transistor amplifiers, Simplified Common Emitter hybrid model, Simplified Calculations for the Common Collector configuration, Common Emitter Amplifier with an emitter resistance, High input resistance transistor circuits.

UNIT-II **Transistor at High Frequencies:** The hybrid π model, need & validity of hybrid π model, CE transistor model, hybrid π conductance the hybrid π capacitance, variation of hybrid π parameters, The CE short circuit current gain, current gain with resistive load, Single stage CE transistor amplifier response, gain bandwidth product, Emitter follower at high frequencies.

UNIT- III **Multistage Amplifier:** Classification of amplifiers, Distortion in amplifier Frequency Response of an amplifier, Step response of an amplifier, Band pass of cascaded stages. RC coupled amplifier, Low frequency response of RC-coupled stage, Effect of emitter by pass- capacitor on low- frequency response, High frequency response of two cascaded CE transistor stages.

UNIT-IV **Feedback Amplifier & Oscillator:** Feedback concept, Transfer gain with feedback, General Characteristics of Negative feedback amplifiers, Input resistance, Output resistance, Method of analysis of a feedback amplifier, Voltage series feedback, Current series feedback, Current shunt feedback, Voltage shunt feedback. General form of Oscillator Circuit,Sinusoidal Oscillators, Phase shift Oscillator, Resonant Circuit Oscillators, Wein Bridge Oscillator, Crystal Oscillators.

UNIT-V **Power Amplifiers:** Classification of amplifiers, class A large Signal amplifiers, Second harmonic distortion, Higher order harmonic generation, Transformer coupled audio power amplifier, Efficiency, Push-pull amplifiers, Class B amplifiers, class AB Operation.

Text Books:

1. Milman&Halkias, "Integrated Electronics", Tata McGraw Hill.
2. Robert L. Boylestad& Louis Nashelsky, "Electronic Devices & Circuit Theory", Pearson Education

Reference Books:

1. Albert Paul Malvino, "Electronic Principles", Tata McGraw Hill.
2. Bernard Grob, "Basic Electronics", McGraw Hill.
3. Millman&Gabrel, "Micro Electronics", Tata McGraw Hill.
4. R.S. Sedha, "A Textbook of Applied Electronics", S. Chand Publications.
5. A.P. Godse& U.A. Bakshi, "Electronic Devices & Circuits - II", Technical Publications Pune.

Course outcomes:

1. Studentswill gain the knowledge of basic transistor amplifier at low frequency & high frequency.
2. Studentswill develop an ability to determine and describe the low frequency & high frequency transistor amplifier through h-parameter model & π model
3. Studentswill the required knowledge of transistor amplifier, multistage amplifier and feedback amplifier.
4. Studentswill be equipped with the knowledge of power amplifier & push pull amplifier.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Electrical Machines**	Code:	**312453 (24)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

The objective of this course is to expose the students on basic knowledge of construction and working of various transformers their equivalent circuit, parameter determination and applications. This course also provides the basic knowledge of various electrical machines (DC and AC), their construction, working principles, characteristics and applications.

UNIT- I **Transformer:** Single phase transformer, construction, principle of operation, EMF equation, transformation ratio, types of single phase transformer, ideal and practical transformer, phasor diagram of ideal and practical transformer on no load and load, equivalent circuit diagram, losses, efficiency, open and short circuit tests, voltage regulation , all day efficiency. Three -phase transformer, Star-Star, Star-Delta, Delta-Delta and Delta-Star connections.

UNIT-II **DC Machines:** Construction of DC Machines, generator action, EMF equations, classification of DC generators, building-up of EMF, operating characteristics of DC generators, losses in DC Machines, efficiency of DC Generator, motor action, back EMF and its significance, production of torque, operating characteristics of DC Motors, necessity of starter, three and four point starter, speed control methods of DC motors, applications.

UNIT- III **Three - Phase Induction Motors:** Construction**,** working principle, types, equivalent circuit diagram, phasor diagram, starting and running torque, torque-slip characteristics, starting and speed control methods of three phase induction motors.

UNIT-IV **Alternator:** Construction, working principle, types of armature windings, winding factors, EMF equation, synchronous reactance and impedance, Phasor diagram, equivalent circuit diagram and voltage regulation by synchronous impedance method of an alternator.

UNIT-V **Synchronous Motor:** Construction, working principle of operation, equivalent circuit, Phasor diagram, power equations, torque equation ,methods of starting, effect of excitation on power factor, synchronous condenser, comparison between three-phase induction and synchronous motors.

Single phase Induction Motor: Construction, working principle and starting methods.

Text Books:

1. B. R, Gupta, “Electrical machines”, New Age International,
2. AshfaqHussain, “Electric Machines”, DhanpatRai Publication

Reference Books:

1. Nagrath& Kothari, “Electric Machines”, TMH Publications,
2. M.G. Say , “Performance and Design of Ac Machines”, C.B.S. Publishers
3. P.K. Mukherjee & S. Chakravarti “Electric Machines”, DhanpatRai Publication,
4. P. S. Bimbhra, “Electrical Machinery”, Khanna Publishers,

Course outcomes:

At the end of this course the student will be able to:

- understand the fundamentals and working of transformers
- draw the equivalent circuit diagrams of various transformers
- understand the working principle and construction of DC and AC machines
- understand the needs and requirements of various types of d.c. machine operations like starting, speed control, tests etc.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Sensors & Transducers**	Code:	**312454 (27)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. The course intends to provide an overview of the principles, operation and application of the different transducer and sensors like, transducer capacitive transducers, Piezo-electric transducers and photo electric transducers.
2. To equip the students with the calibration concept, selection & application of Sensors & Transducers.
3. To equip the students with the basic and advanced knowledge of Pressure, Temperature, flow, force & torque measurements.

UNIT- I **Introduction to Sensors & Transducer:** Transducer definition, classification, and performance characteristics. Resistive: Potentiometer and its types, loading effect, Sensitivity, Piezo-resistive, equivalent circuits, charge and voltage sensitivity, Inductive: LVDT, RVDT, variable, reluctance, self-inductance and mutual inductance. Capacitive: single plate, differential capacitance cell and measurement circuits. Piezoelectric transducer, photoelectric transducer, Specifications of sensors, static and dynamic characteristics calculations, selection criteria for sensors

UNIT-II **Measurement of Force and Torque:** Strain gauge, Rosettes, Load cell, Strain gauge torque meter, Inductive torque transducer, Magneto-strictive transducer, Digital methods.

UNIT- III **Pressure Measurement:** Terminology, pressure units & measuring instruments, manometers-U-tube double column, Cistern type, mechanical displacement type pressure gauge, elastic pressure transducer: Bourdon, diaphragm & bellows, low pressure gauge, high pressure measurement, CRO for varying pressure measurement and dead weight piston gauge.

UNIT-IV **Flow Sensors:** Nature of flow classification of fluid flow measurement techniques, Theory of variable head meters, constructional details of variable head meters– Venturimeter, Flow Nozzle, Orifice flow meter, variable area flow meters, Quantity meters, Special flow meters- Hot wire Anemometer, Allen salt velocity method, EM flow meter, Ultrasonic flow meter, turbine and other rotary element flow meters, ultrasonic flow meters, Doppler, cross correlation flow meters, Vortex flow meters, flow visualization.

UNIT-V **Temperature Measurement:** Temperature scales units and relations, classification of temperature sensors, liquid in glass thermometer, bimetallic thermometer, Filled system Thermometers, Resistance thermometers & thermostats, Thermocouple: terminologies, types, characteristics, Thermistor, radiation & optical pyrometers, calibration of temperature sensors, errors & precaution in temperature measurement.

Text Books:

1. D.S. Kumar, “Mechanical Measurement & Control”, Metropolitan Publication.
2. A. K. Sawhney, “Electrical & Electronics Measurement & Instrumentation”, DhanpatRai Publication.

Reference Books:

1. Nakra-Chaudhary, “Instrumentation Measurement and Analysis”, Tata McGraw Hill Publications.
2. James W. Dally, William Franklin Riley, Kenneth G. McConnell, "Instrumentation for engineering measurements", 2nd Ed, John Wiley & Sons.
3. Doebelin, E.O. “Measurement Systems Application and Design” , fourth edition McGraw Hill International.
4. S. K. Singh “Industrial Instrumentation & Control” 3rd Edition Tata McGraw-Hill education.
5. Joseph J. Carr, “Elements of Electronic Instrumentation and Measurements", 3rd Edition, Pearson Education.

Course outcomes:

1. Students should have the knowledge of basic connection to kit such as power, input signal, and voltage measurement.
2. Students should have the knowledge of LVDT and displacement measurement.
3. Students should have the knowledge to design the characteristics of strain gauge and measurement of force.
4. Students should have the knowledge to design characteristics of NTC, Thermistor.
5. Students should have the knowledge to draw the characteristics of photovoltaic cell and photoconductive cell.
6. Students should have knowledge to draw characteristics of sound sensing switches (IC -555).

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Microprocessor & Interfaces**	Code:	**312455 (28)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:
To introduce the architecture, interfacing and programming of 8085 microprocessor and various peripheral interfacing devices.

UNIT- I **MICROPROCESSOR ARCHITECTURE:** Introduction to Microprocessors, Architectureof 8085, PinConfigurationand Function, internalregister&flagregister,GenerationofControlSignals:Bus Timings:Demultiplexingofaddress/ data bus; Fetch Cycle, Execute Cycle, Instruction Cycle, Instruction Timings and Operation Status, Timing Diagram.

UNIT-II **INSTRUCTION SET AND PROGRAMMING WITH 8085:** Instruction forDataTransfer,ArithmeticandLogical Operations, Branching Operation, Machine Cycle Concept,Addressing Modes,InstructionsFormat, Stacks, Subroutine and RelatedInstructions, ElementaryConceptsof Assemblers,AssemblerDirectives,LoopingandCounting, Software Counters with Time Delays, Simple Programs using Instruction Set of 8085, Debugging, Programs Involving Subroutines, Programs forCodeConversion e.g.BCDtoBinary,BinarytoBCD,BinarytoSeven-SegmentLED Display. Binaryto ASCII, ASCII to Binary, Program for Addition Subtraction, Programsfor Multiplication and DivisionofUnsignedBinaryNumbers.

UNIT- III **DATA TRANSFER &DEVICE SELECTION:** FormatofDataTransfer:ModesofDataTransfer:TypeofI/OAddressing: Conditionof Data Transfer: MicroprocessorControlled Data Transfer:Peripheral Controlled DataTransfer: Absolute andLinear Select Decoding.
Semiconductor Memories: Static & Dynamic RAM Cell, ROM, PROM, EPROM, EEPROM, UVPROM, FlashMemoryand I/O Interfacing: Use of Decoders Selection, Memory organizationandMapping.

UNIT-IV **INTERRUPTS:** Restart Instruction, Hardware Implementation, Interrupt Processing, Multiple Interrupts and Priority Concepts,InterruptStructureof8085,Instructionsrelatedto interrupts,PendingInterrupts, Useof Interruptand Handshaking SignalsinInterfacing,ApplicationofInterrupts andIllustrativePrograms.

UNIT-V **ARCHITECTURE OF PERIPHERAL INTERFACING DEVICES:** Architecture, Pin Diagram and functioning of 8155/8156(RAM), 8355/8755(ROM),8255(PPI).SimpleprogramslikeInitializationandI/Ooperationsoftheports,Timeroperation of8155. ProgrammableIntervalTimer 8253/8254: Block Diagram, Pin Configuration, Modes, Initialization Instruction, Interfacing andSimpleProgramstogenerate varioustypesofsignals. Architecture,Pindiagram, descriptionandinitializationofKeyboardanddisplayinterface (8279),USART(8251), 8259A Programmable interrupt Controller, Direct Memory Access(DMA), 8237 DMA Controller.

Text Books:

1. MicroprocessorArchitecture,Programming andApplication - R.S.Gaonkar,WileyEastern
2. DigitalSystems–FromGates toMicroprocessors-SanjayK.Bose, NewAgeInternationalPublishers.
3. Digital Integrated Electronics – Taub and Schilling, Tata McGraw Hill.

Reference Books:

1. 8085MicroprocessorProgramming&Interfacing–N.K.Srinath,PHI.
2. DigitalComputerElectronics–Malvino,Tata McGraw Hill.
3. Microprocessors:TheoryandApplications–IntelandMotorolla,Rafiquuzzaman, PHI.
4. 0000to8085:IntroductiontoMicroprocessor forEngineersandScientists,Ghosh&Sridhar,PHI.

Course outcomes:
1. Gain knowledge about architecture of general purpose microprocessor.
2. Students will be able to describe physical and logical configuration of memory.
3. Demonstrate the ability to program the 8085 microprocessor.
4. Interface the 8085 microprocessor to the outside world.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Signals and Systems**	Code:	**312456 (28)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To describe continuous time and discrete-time signals and systems.
2. Proficiently use various methods and approaches to solve problems with signals and systems prepared for upper-level courses in communication systems, control systems, and digital signal processing.

UNIT- I **Classification of Signals and Systems:** Representation of Discrete time signals, Elementary signals, Basic Operation on Signals, Classification of Signals: Deterministic and random, periodic and non-periodic, Energy and power, Causal and non-causal, Even and odd Signals, Classification of Systems: lumped and distributed parameter, static and dynamic, causal and non-causal, linear and no- linear, time variant and time invariant, stable and unstable , invertible and non-invertible , FIR and IIR systems.

UNIT-II **Fourier analysis of Continuous time signals:** Representation of Continuous time Fourier series(CTFS), Existence, Trigonometric form, Cosine representation, wave symmetry, Exponential Fourier series, Fourier spectrum, Power representation using Fourier series, Properties of CTFS.Fourier transform(CTFT) of non-periodic functions, Magnitude and phase representation of Fourier transform, existence, Fourier transform of standard signals, Properties of CTFT, Fourier transform of periodic signals.

UNIT- III **Analysis of discrete time signals and systems:** Sampling and aliasing ,Linear convolution, Circular convolution, correlation, cross correlation, autocorrelation, circular correlation, Fourier transform of Discrete time signals (DTFT), Properties of DTFT, Analysis of LTI Discrete time systems,.

UNIT-IV **Z Transform:** Relation between z transform and DTFT Region of convergence, Properties, Poles and Zeros of rational function of Z, Inverse Z transform, Analysis of LTI Discrete time systems using Z transform.

UNIT-V **Structures for Realization of IIR and FIR Systems:** Discrete time IIR and FIR systems, structures for realization of IIR systems, Structures for realization FIR systems: Direct form-I, Direct form-II, Cascade and parallel form. State model of discrete time systems, state model from direct form –II, transfer function using state model, solution of state equation and response of discrete time systems

Text Books:

1. Signals & Systems: A Anand Kumar, 2nd Ed, PHI
2. Signals & Systems: A NagoorKani , TMH Publication
3. Signals & Systems: Alan Oppenheim & Alan Wilsky, S Nawab, PHI

Reference Books:

1. Signals, Systems and Communications: B.P. Lathi, BS Publications

Course outcomes:

1. The student will be able to understand the classification of signals and systems.
2. Gain knowledge about the frequency domain analysis of continuous time and discrete time signals.
3. Use the Z-transform techniques to solve the system equations.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Applied Electronics Laboratory**	Code:	**312461 (12)**
Total Lab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of Experiments: *(At least Ten experiments are to be performed by each student)*

1. To study RF tuned amplifier with its freq. Response & calculation of resonant frequency.
2. To study & calculation of 2 stage RC coupled amplifier for individual & overall gain.
3. To study frequency response curve of voltage shunt feedback amplifier.
4. To study current series feedback amplifier with measurement of voltage Gain with un bypassed Resistor & to measure frequency response curve.
5. Study of variation in resonant frequency of Wien bridge oscillator
6. Study of variation in resonant frequency of Hartley oscillator
7. Study of variation of frequency rouge of RC phase shift oscillator
8. Study of variation in frequency of Colpitt's oscillator
9. Study of variation in frequency of Clapp's oscillator
10. Study of frequency response of class 'A' power amplifier & calculation of frequency
11. Study of variation in resonant frequency of Wien bridge oscillator
12. Comparison of phase shifted and feedback voltage waveform
13. To calculate percentage tilt of amplifier using square wave
14. Study of class B push pull amplifier.

List of Equipments/Machine Required:

- Analog & Digital Trainer Kit
- Feed –back amplifier
- Hartley oscillator
- Power amplifier
- R-C coupled amplifier
- R –C phase shift oscillator
- Wien bridge oscillator

Reference Books:

A.P. Godse& U.A. Bakshi, "Electronic Devices & Circuits - II", Technical Publications Pune.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Sensors and Transducers Laboratory**	Code:	**312462 (12)**
Total Lab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks :	**20**

List of Experiments: *(At least Ten experiments are to be performed by each student)*

1. To study characteristics and Measurement of displacement by using LVDT.
2. To study and measurement of temperature by using Platinum Resistance Temperature Detector (RTD).
3. To study and measurement of temperature by using NTC thermistor.
4. To study and measurement of temperature by using IC temperature sensor (LM 335).
5. To study and measure light intensity using photo- voltaic cell.
6. To study and measure light intensity using photo- conductive cell.
7. To study and measure light intensity using PIN photo diode.
8. To study and measure light intensity using photo-transistor.
9. Study the Characteristics of strain gauge & Measurement of force.
10. Study of Thermocouple (B, E, J, K, R, S, and T) characteristics (Change in voltage as a function of temperature).
11. Measurement of speed of motor by Hall Effect sensor.
12. Measurement of speed of motor shaft with the help of non contact type of pickup.
13. Study of transistor as temperature sensor (Measurement of output voltage proportional to temperature).
14. Measurement of pressure using pressure Transducer and to calculate percentage error.

List of Equipments/Machine Required:

- LVDT.
- Temperature transducer.
- Optical transducer trainer.
- Strain gauge.
- Pressure transducer.
- Speed Sensing Transducer

Reference Books:

1. D.S. Kumar, “Mechanical Measurement & Control”, Metropolitan Publication.
2. A. K. Sawhney, “Electrical & Electronics Measurement & Instrumentation”, DhanpatRai Publication.
3. James W. Dally, William Franklin Riley, Kenneth G. McConnell, "Instrumentation for engineering measurements", 2nd Ed, John Wiley & Sons.
4. S. K. Singh “Industrial Instrumentation & Control” 3rd Edition Tata McGraw-Hill education.

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Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Electronics Workshop**	Code:	**312463 (12)**
Total Lab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of Experiments: *(At least Ten experiments are to be performed by each student)*

1. To study the all types resistances and their color code chart.
2. To study the all types of capacitors (variable and fixed type) and their color-codes.
3. To identify and check the types of transistor (NPN, PNP).
4. To identify the types of diode (rectifier, switching, zener, detector).
5. To learn the design technique of PCB using PCB designing software.
6. To fabricate a PCB.
7. To learn PCB drilling technique.
8. To learn PCB tinning technique.
9. To design a transformer.
10. To learn soldering- desoldering technique.
11. To design and fabricate a DC power supply using bridge rectifier on PCB.
12. To design and fabricate a DC power supply using full wave rectifier on PCB.
13. To learn the use of SMD reworks station.
14. To design and fabricate any popular working project on electronics.
15. To learn the operation of CRO.
16. Measurement of voltage frequency using CRO.
17. Measurement of frequency and phase using Lissajus pattern.

List of Equipments/Machine Required:

- Film making unit
- Deep coating machine
- UV exposure unit
- PCB curring machine
- PCB etching machine
- PCB drilling machine
- PCB tining machine
- Magnifying lamp
- Soldering &desoldering iron
- LCR meter
- Digital & analog multimeter
- PCB making software (ULTIBOARD, PROTEL, EXPRESS LAB etc.)
- Resistance color code chart
- Capacitor color code chart
- Transistor chart

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Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Microprocessor & Interfaces Laboratory**	Code:	**312464 (12)**
Total Lab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of Experiments: *(At least Ten experiments are to be performed by each student)*

1. **Reversing an Array:** A Block of 16 bytes are residing at locations starting from BLOCK : WAP to transfer the block in reverse order at locations starting from BLOCK 2.
2. **Sorting in Ascending Order:** A block (16 bytes are residing at locations starting from DATA : Write a program to arrange the word in the same location in ascending order.
3. **Binary Addition:** 16 bytes are residing at location starting from DATA WAP : to add all bytes and store the result location SUM and SUM + 1.
4. **BCD Addition:** 16 BCD NUMBER are residing at location starting from DATA WAP to add all bytes and store the result location SUM and SUM + 1.
5. **Multiplication:**Two bytes are residing at location DATA 1 and DATA 2 Write a program to multiply the two bytes and store the result at location PROD 1 and PROD 2.
6. **Binary to BCD:** A binary number is residing at location BIN > WAP to convert the binary number in to its equivalent BCD and store the result at BCD and BCD + 1.
7. **BCD to Binary:** A BCD number is residing at location BCD; Write a program to convert the BCD number into its equivalent binary and store the result at BIN.
8. **MultibyteAddition:**Two 10 bytes are residing at location starting from DATA 1 and DATA 2 respectively ,Write a program two add them up and store the result at location starting from RESULT (result space 11 bytes).
9. **Multibyte BCD Addtion:** Two 6 digits BCD numbers are residing at location starting from DATA 1 and DATA 2 respectively. Write a program to add them up and store the result at locations starting from RESULT (Result space 7 bytes).
10. **RST 6.5:** A block of 16 bytes is residing at location starting from ; DATA Reverse the block and store the bytes at REVERSE whenever the RST 6.5 key is pressed.
11. **Editing of ASCII String:**A string of ASCII characters is residing at locations starting from READ which contain "I $ WILL $ BE $ AN $ ENGINEER ". Edit string in such a way that it should contain "I $ will $ be $ Engineer ". Keep the edited string in the same locations. Product the string from further editing. ($ stands for a blank).
12. **Signed Binary Addition:**A block of 16 signed binary numbers is residing at locations NUMBERS. Add them up and store the result (in signed binary) at locations from RESULT.
13. **ASCII Code Conversion:**A string of 16 ASCII characters are residing at locations starting from DATA .The string consists of codes for capital letters, small letters and BCD digits (0-9). Convert the ASCII characters. In such a way that the codes for capital letters be converted into corresponding codes for small letters, codes for small letters into that of capital letters and codes for BCD digits into that of BCD numbers and store them at the same locations.
14. **Parity Check:** A block of 32 bytes is residing at DATA count the number (BCD) of times even and odd parity bytes are appearing consecutive memory locations. Keep the count at MATCH.
15. **Series Generation:** Two BCD numbers a and b are residing at locations DATA 1 and DATA 2 respectively. Write a program to form a series in BCD with the elements of a. a + 2b, a + 4b, a + 6b ……. Stop the generation of the series whenever any element of the series in BCD with the elements of the series exceeds (99). Store the result at locations starting from RESULT. Count the number (BCD) of elements in the series and store it at NUMBER.

List of Equipments/Machine Required:
8085 based microprocessor kit, MASM assembler, 8085 simulator, PCs.

Recommended Books:
8085 Microprocessor Programming & Interfacing – N.K. Srinath, PHI

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Applied Electronics & Instrumentation**	Semester:	**IV**
Subject:	**Health, Hygiene & Yoga**	Code:	**312465 (46)**
No. Of Periods:	**2 Periods/Week**	Total Tutorial Periods:	**NIL**
Maximum Marks:	**40**	**Minimum Marks:**	**24**

Course Objectives:

5 To provide understanding the importance of health.
6 To provide insight into the hygiene aspect & quality of life.
7 To study the concepts of various medical therapy.
8 To practice the various yogasans.
9 To provide knowledge about common diseases and its cure through yagasans and pranayam.
10 To develop concentration through various methods.

UNIT- I **HEALTH & HYGIENE:** Concept of health, Physical health and mentall health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and underrating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs nutritious food; fruits, vegetables cereals and qualities of each of these.

UNIT-II **INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE:** History, development, basic concepts, modes of operation of Alopathy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accurpressure, Accupunture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

UNIT- III **YOGASANS:** Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshep Mudra.

UNIT-IV **YOGASANS FOR COMMON DISEASES:** From Yogic MateriaMedica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomache disorders, such as, indigestion, acidity, dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:**Shavasan, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain:**Shirshpadasan, Shashankasan.
- **Asans for eye sight:**Tratak, NetiKriya .
- **Pranayam:** Definition and types: NadiShodhan, Bhastrik, Shitakari, Bhramari useful for students.

UNIT-V **CONCENTRATION:** Concentration of mind and how to achieve it. Tratak (त्राटक), Concentration on breath, Japa (जप), Ajapajap (अजपाजप), internal silence (अन्तर्मौन), visualization in mental sky (चिदाकाश धारणा), Concentration on point of light (ज्योति ध्यान), Concentration on feeling (भाव ध्यान), Concentration on figure (मूर्त्त ध्यान).

Text Books:

Health, Hygiene & Yoga,Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

Reference Books:

(1) Yogic MateriaMedica
(2) Asan, Pranayam and Bandh.