Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch**: Electrical Engineering** Semester**: VI**
Subject:**Instrumentation Techniques** Code: **C024611(024)**
Periods per week (L-T-P):**(3-1-0)** Credits**: 4**
Number of class Test to be conducted: **2 (Minimum)** No. of assignment to be submitted: **02**

COURSE OUTCOMES: After successful completion of this course, the student will able to:

S.N	CO Statement	Knowledge Level
1	Distinguish between CT, PT and Evaluate error presents in instruments	5
2	Measure of linear displacement, Angular displacement, pressure, force, temperature, strain by Transducers.	5
3	Make use of DAS and about varies Recorders used in industries.	3
4	Explain the architecture and I/O module of PLC.	2
5	Develop and Execute Ladder Programming in PLC.	3

COURSE DETAILS:

UNIT I Errors in Measuring Instruments& CT PT: Errors in measurement, general and statistical analysis of errors, Instrument transformers, errors of CTs and PTs, methods of reduction of errors of instrument transformers,Testing of CTs (Absolute and Silabee's methods), Testing of PTs: Absolute and method using wattmeter. **[8]**

UNIT II Passive and Active Electrical Transducers: Resistive, capacitive, inductive, piezoelectric, selection of transducers, transducers characteristics, frequency generating transducers, pressure inductive transducers, LVDT, differential output transducer, thermistor, strain gauge, Hall effect transducers, measurement of angular and linear velocity using electrical transducers, reluctance pulse pick-ups. **[10]**

UNIT III Data Acquisition System and Recorders: Introduction of DAS, Objective of DAS, Signal conditioning ofinputs, single and multi-channel DAS, Computer based DAS, Sample and hold, Multiplexing, D/A, A/Dconversion general description of Data loggers, Digital transducers, optical encoders, resistive digitalencoders, shaft encoders.Recorders: Introduction, Strip chart recorders, General description of XY recorders, galvanometer type recorders,potentiometric recorders. **[7]**

UNIT IV PLC: Introduction, PLC and Operations, Basic ladder diagram, General PLC Programming Procedure, Devices to which PLC Input and Output Modules are connected. **[5]**

UNIT V Basic PLC Programming and Functions: Programming On-Off inputs to produce On-Off outputs, Relation of Digital Gate Logic to Contact / Coil Logic, Creating Ladder diagrams from process control descriptions.Basic PLC Functions, Register Basics, PLC Time Functions, PLC Counter Functions. **[6]**

Text Books:

1. Electrical and Electronics Measurements and Instrumentation:.Purkait, B Biswas, S. Das and C. Koley, McGraw hill
2. Electronic Measurements and Instrumentation: K. Lal Kishore, Pearson.
3. Programmable Logic Controllers, John W.Webb, Ronald A. Reis, Prentice Hall .

Reference Books:

1. Electronic Instrumentation by H. S. Kalsi, McGraw Hill
2. Instrumentation Measurement and Analysis: Nakra and Chaudhry, McGraw Hill.
3. Electronic Instruments and Instrumentation Technology" by M.M.S. Anand, PHI Publications

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: Electrical Engineering **Semester: 6th**
Subject: Switchgear & Protection **Subject Code: C024612(024)**
Periods/Week: (L-T-P) (3-1-2) **Credits: 04**
Minimum number of Class tests to be conducted: 02
Minimum number of Assignments: 02
Scheme of Examination (Theory): Total Marks – 150 [ESE – 100, CT – 20, TA – 30]

COURSE OUTCOMES: After successful completion of this course, the students will be able to:-

S. No.	CO Statement	Knowledge Level
1	Explain working of various protective relays.	**2**
2	Design suitable Protection Schemes for Alternators.	**6**
3	Design the required Protection Schemes for various Transformers, Feeders & Transmission Lines according to their usage.	**6**
4	Design various Comparators for designing various relays.	**6**
5	Analyze various types of the circuit breakers, the arc quenching phenomena and the protection against over voltages.	**4**

UNIT-I

RELAY: Terminology, Basic circuit, relay connection with trip circuit and circuit breaker, objectives of protection, types of relay, construction and operation of instantaneous over current relay. I.DM.T. Relay, directional Unit, differential relay, percentage differential relay, Generalized torque expression, logical construction of impedance reactance, MHO and Off-set MHO Relays using generalized torque expression.

UNIT-II

Protection of Alternators and Bus Bars: Differential protection, Protection of stator against phases to ground fault, phase to phase faults, inter turn fault, protection against unbalanced loading, protection of rotor against ground fault, field failure, reverse power, back up protection, field suppression, protection of bus bars, frame leakage protection, differential protection.

UNIT III

Protection of Transformers & Feeders: differential protection of transformers for different winding configurations, difficulties encountered in differential protection and their remedies, Buchholz relay, protection of feeders, protection of ring main and parallel feeders, protection of radial feeders by over current relays, distance relays and carrier current protection scheme.

UNIT IV

Static Relays: directional relay, impedance relay, admittance relay and admittance relay, amplitude comparator, phase comparator, duality between amplitude and phase comparators.

UNIT V

Circuit Breakers and Fuses: Arc formation, arc interruption and re-striking voltage, current chopping, resistance switching, Air blast circuit breakers, minimum and bulk oil circuit breakers, SF6 and Vacuum Circuit breakers, definitions of terms in fuses, HRC fuses.

Text Books:

1. "Power system protection and switchgear", Ravindranath and Chander, TMH
2. "Power system protection", Badri Ram, TMH.
3. "Fundamentals of power system protection", Paithankar and Bhinde, PHI
4. "Switchgear and Protection" by Sunil S. Rao, Khanna Publishers

Reference books:

1. “Electrical power system”, C L Wadhwa, New Age.
2. J and P switchgear handbook

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch**: Electrical Engineering** Semester**: VI**
Subject: **Microprocessor and its applications** Code: **C024613(024)**
Periods per week (L-T-P):**(3-1-0)** Credits**: 04**
Number of class Test to be conducted: **2 (Minimum)** No. of assignment to be submitted: **2**
Scheme of Examination (Theory): **Total Marks-150 [ESE-100, CT-20, TA-30]**

COURSE OUTCOMES: After successful completion of this course, the student will able to:

S.N	CO Statement	Knowledge Level
1	Explain the architecture and Software model of Intel's 8085 8-bit Microprocessor.	2
2	Develop and Execute 8085 assembly level programs and manually translate them to Machine Language Programs	3
3	Design interfacing circuit for memory and I/Os using MSI ICs.	6
4	Apply 8085 interrupt system to interface peripheral and IOs in interrupt driven data transfer mode.	3
5	Select various peripheral ICs like 8255, 8155, 8256, 8253, 8254 with 8085 Microprocessor.	3

COURSE DETAILS:

UNIT I Microprocessor Architecture: Brief Introduction to Microprocessors, Architecture of 8085, Pin Configuration and their Functions; internal registers & flag register, memory-stack organization, Generation of Control Signals, demultiplexing of address / data bus, Machine cycle, status and Control Signals.

UNIT II Instruction Set and Programming with 8085: Instruction for Data Transfer, Arithmetic, Logical Operations and Branching Operation. Stacks, Subroutine and Related Instructions. Addressing Modes, Instructions Format. Simple Programs using Instruction Set of 8085.

UNIT III Data Transfer and Device Selection: Format of Data Transfer, Modes of Data Transfer, Type of I/O Addressing, Condition of Data Transfer: Microprocessor Controlled Data Transfer/ Peripheral Controlled Data Transfer, Absolute and Linear Select Decoding, Memory and I/O Interfacing, Use of Decoders Selection.

UNIT IV Interrupts: Restart Instruction; Hardware Implementation, Interrupt Processing; Multiple Interrupts and Priority Concepts, Interrupt Structure of 8085, Instructions related to interrupts, Pending Interrupts, Application of Interrupts and simple illustrative Programs.

UNIT V Architecture of Peripheral Interfacing Devices: Architecture, Pin Diagram and functioning of 8155/8156, 8255 (PPI). Simple programs like Initialization and I/O operations of the ports using simple I/O mode, Timer operation of 8155. Architecture, Pin diagram & description of USART (8251). Block Diagram, Pin Configuration of Programmable Interval Timer 8253/8254:.

Name of Text Books:

1. Microprocessor Architecture, Programming and Application by R. S. Gaonkar, Wiley Eastern
2. Digital Systems – From Gates to Microprocessors by Sanjay K. Bose, New Age International Publishers.
3. Introduction to Microprocessors by Aditya P Mathur, 3rd Edition, Tata Mc Graw Hill

Name of Reference Books:

1. 8085 Microprocessor Programming & Interfacing – N.K. Srinath, PHI
2. Digital Computer Electronics – Malvino, TMH
3. Microprocessors: Theory and Applications – Intel and Motorolla, Rafiquuzzaman, PHI.
4. 0000 to 8085: Introduction to Microprocessor for Engineers and Scientists, Ghosh & Sridhar, PHI

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Electrical Engineering** Semester: **VI**
Subject: **Instrumentation Techniques Laboratory** Code: **C024621(024)**

List of Experiments: (Minimum 10 experiments to be done from the list given below)

1. Measurement of % ratio error and phase angle error of CT.

2. Measurement of current, voltage and power using CT & PT.

3. Measurement of displacement using LVDT.

4. Measurement of force using strain gauge.

5. To Study Piezo-electric transducer.

6. Measurement of displacement using capacitive pickup.

7. To demonstrate the operation of D/A converter.

8. To demonstrate the operation of A/D converter.

9. Measurement of intensity of light.

10. Measurement of angular displacement using capacitor transducer.

11. Industrial automation demonstration through PLC.

12. Measurement of current / voltage using Hall.

13. Measurement of liquid level using capacitive pick-up.

14. Speed control of DC motor using PLC.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: Electrical Engg. **Semester: 6TH**
Subject: Switchgear & Protection Lab **Subject Code: C024622(024)**
Total practical periods: 30 **Credis: 01**
Scheme of Examination (Theory): Total Marks – 60 [ESE – 40, TA – 20]

List of experiments: (To be performed minimum 10 experiments)

COURSE OUTCOMES: After successful completion of this course, the students will be able to:-

S. No.	CO Statement	Knowledge Level
1	Understand the working of various relays like IDMT relay, Instantaneous Over-current relay, etc.	2
2	Design a suitable protection scheme according to the requirement.	6
3	Design a Percentage-Biased Differential Protection Schemes for Alternators & Transformers according to its needs.	6
4	Understand the working of most important relay for Transformer i.e. Buchholz Relay.	2
5	Analyze the various protection schemes for various types of faults.	4

1. To study Over-Current Relay static type & draw characteristics.
2. To study under voltage relay electromechanical type & draw characteristics.
3. To study over voltage relay electromechanical type & draw characteristics.
4. To study IDMT Over current relay Electromechanical Type & draw current verses time characteristics.
5. To study IDMT earth fault relay electromechanical type draw current verses time characteristics.
6. To study operating characteristics of percentage-biased differential relays to plot the characteristics of percentage biased differential relay for 30%, 40%, & 20%.
7. To determine the characteristics of instantaneous relays.
8. To study Buchholz Relays.
9. To study Solid State O.C.R.
10. To study Merz Price Protection of transformer (Simulation Model).

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch**: Electrical Engineering** Semester**: VI**
Subject: **Microprocessors Lab** Code: **C024623(024)**
Periods per week (L-T-P):**(0-0-2)** Credits**: 01**
Scheme of Examination (Theory): **Total Marks-60 [ESE-40, TA-20]**

COURSE OBJECTIVES: After successful completion of this course, the student will able to:

Course Code	CO Statement	Knowledge Level
1	Develop and execute various programs on 8085 Microprocessor kit/ 8085 Simulator.	3

List of experiments: (Minimum 10 experiments are to be performed)

1. To Transfer data into specified register.
2. To add content of two register and store result in another register.
3. To add content of two memory locations and store result in another memory locations.
4. To find 2's complement of 8 bit number stored in a memory location.
5. To mask upper nibble of the 8 bit numberstored in a memory location.
6. To transfer block of 10 data bytes from one memory location to another.
7. To transfer block of 10 data bytes from one memory location to another in reverse order.
8. To multiply two 8 bit numbers.
9. To add contents of a block of 10 data bytes.
10. To find largest among the 10 given data bytes.
11. To find number of even and odd values from a given block of data bytes.
12. Sorting given data bytes in ascending order.
13. Two 16 bit numbers are residing at some memory location, Write a program two add them up and store the result at some other memory location.
14. To count the how many number of times even and odd PARITY bytes are appearing in 256 consecutive memory locations.
15. To convert a binary number in to its equivalent BCD.

Apparatus Required:

1. Microprocessor 8085 Kit or 8085 Simulator Software

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch**: Electrical Engineering** Semester**: VI**
Subject: Programming and Simulation **Lab** Code:
Periods per week (L-T-P):**(0-0-2)** Credits**: 01**
Scheme of Examination (Theory): **Total Marks-60 [ESE-40, TA-20]**

COURSE OBJECTIVES: After successful completion of this course, the student will able to:

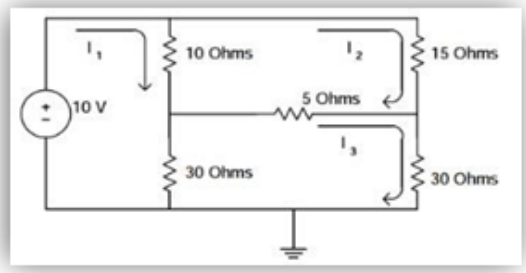
Course Code	CO Statement	Knowledge Level
1	Develop and execute various programs on MATLAB/Scilab or any other suitable Simulation software	3

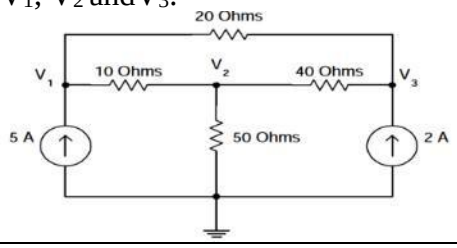
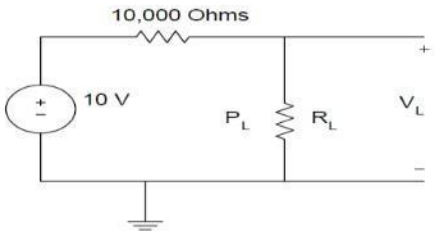
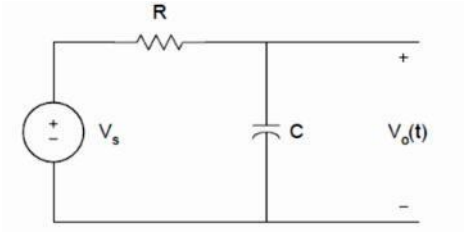
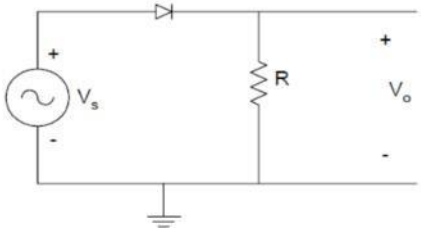
CourseOutcomes:

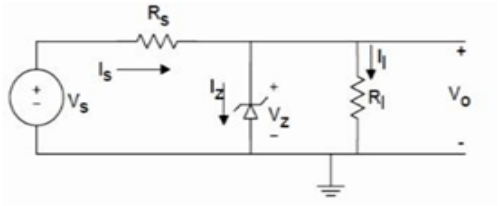
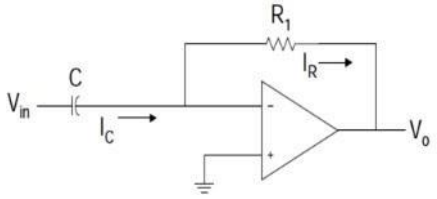
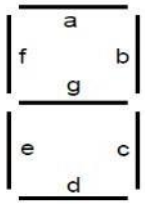
On successful completion of the Course, the student will be able to:

1. Understand the main features and importance of the MATLAB/ SCI LAB mathematical programming environment.
2. Apply working knowledge of MATLAB/ SCI LAB package to simulate and solve Electrical, Electronic circuits and Applications.
3. Solve, Simulate and Analyse various DC circuits.
4. Solve, Simulate and Analyse various AC circuits.
5. Solve, Simulate and Analyse various Analog and Digital Electronics circuits.
6. Solve, Simulate and Analyse simple Transformer and DC Generator circuits.

List of experiments: (Minimum 10 experiments are to be performed)

Sl. No.	**Topic/Exercises**
1	Ohm's law - If *R* = 10 Ohms and the current is increased from 0 to 10 A with increments of 2A.Write a program/ simulate to generate a table of current, voltage and power dissipation.
2	Resistances combination- Write a program/ simulate to solve the equivalent resistance of series and parallel combinations up to three resistances R1, R2 and R3.
3	KVL- Using Mesh/ loop analysis solve and simulate the given circuit to find the loop currents I_1, I_2 and I_3. 

4	KCL- Using Nodal analysis, solve and simulate the given circuit to find the nodal voltages V_1, V_2 and V_3. 
5	Maximum Power Transfer theorem- In figure the R_L varies from 0 to 50 k Ω, Write a program and simulate to plot the power dissipated by the load. Verify that the maximum power dissipation by the load occurs when R_L is 10 kΩ. 
6	Impedance and Admittance- Consider impedance Z for any R-L-C circuit and express it both in rectangular and polar form. Also compute Admittance Y.
7	RL ac circuit- For an series R-L circuit, the voltage $v(t)$ and current $i(t)$ are given as; $v(t) = 10\cos(377t)$ $i(t) = 5\cos(377t + 60^0)$ Simulate the above condition and plot a sketch of $v(t)$ and $i(t)$ for t = 0 to 20 milli seconds.
8	RC circuit- For the figure shown, the input voltage is a rectangular pulse with an amplitude of 5 Volts and a width of 0.5 sec. C = 10 μF and R = 1000 kΩ. Write a program and simulate to plot the output voltage $V_0(t)$ from zero seconds and end at 1.5 seconds. 
9	Half Wave Rectifier- A half-wave rectifier circuit is shown in figure. It consistsofanalternatingcurrent(ac)source,adiodeandaresistor.Writea program and simulate to obtain the input and output plots. Assume suitable values for the ac source and time frame. 

10	Zener Voltage Regulator- A zener voltage regulator circuit of figure has the following data:  Write a program to obtain the Breakdown characteristics and calculate the output voltage Vs = 30 Volts and Vs = 35 Volts.
11	OPAMP Differentiator- For the figure given assume suitable values for Input voltage and circuit components. Write a program and simulate to show a plot for OPAMP differentiator operation. 
12	Number System- Write a program and obtain code conversion for the following. a) $(99)_{10} = (?)_2$ b). $(10011100)_2 = (?)_{10}$ c). $(6F9)_{16} = (?)_2$ and $(?)_{10}$
13	Logic gates- Write a program/ script file that produces a truth tables for the NOT, AND, OR, NAND, NOR, and EXOR operations. Take a and b inputs as 4 bits.
14	De-Morgan's Theorems- Write a program/ M-file to obtain the Truth Table to Prove De-Morgan's Theorems.
15	Seven segment Display- Write a program to solve the 7 Boolean expressions of Seven segment display to get the results in table form to indicate 'Display digit and segment LEDs on'.  [To display the digit with 7 LEDs (light emitting diode) arranged as shown in Fig, the input D should be converted to 4-bit digit code and assigned to 7 Boolean functions to determine the on or off state of each diode in the 7- segment LED display]
16	Transformers- Write a program to compute voltages of primary and secondary, primary current and secondary current. The inputs are kVA = 100, E1 = 230 kV, transformation ratio K = 0.6. Missing data may be assumedsuitably. $30 \le V_S \le 35\text{V};\quad R_L = 10\text{K},\quad R_S = 2\text{K}$
17	DC Generators- Write a program to compute Emf generated in dc shunt generator with the given parameters like I_a= 10 A, I_L = 9 A, R_a = 0.5 Ω, Rsh= 120 Ω, and R_L= 6 Ω. Missing data may be assumed suitably.
18	To develop a computer program to form the bus admittance matrix, Y bus of a given power system.

Reference Books:

For Programming:

1. Getting started with MATLAB by RudraPratap, Oxford University Press,2005.
2. MATLAB and its Applications in Engineering by Rajkumar Bansal, Pearson Publishers, ISBN-10: 8131716813,2009.
3. SCILAB(a Free Software to Matlab),Er. Hema Ramachandran and Dr. Achutsankar Nair, S. Chand Publishers, ISBN-10: 8121939704,2011.

For Electrical Engg. Basics:

4. Basic Electrical and Electronics Engineering by S. K. Bhattacharya, Pearson Education India, 2012 Edition.
5. A Text Book of Practicals in Electrical Engineering by Dr. N. K. Jain, DhanpatRai Publishing Company,2009.

For Electronics Engg. Basics:

6. Electronics Laboratory Primer by S. Poornachandra and B. Sasikala, S. Chand Publishers and Co,2010.
7. Laboratory Experiments and PSPICE Simulations in Analog Electronics by L.K.Maheshwari and M.M.S.Anand Publishers – PHI Learning Pvt.Ltd.
8. *Digital Electronics*: Principles and Applications by R. L. Tokheim, Tata McGraw- Hill Education,2013.

Freely Available e-Resources/e-Books:

1. http://in.mathworks.com/

2. https://www.scilab.org/resources/documentation/tutorials

3. Introduction to Programming with Matlab by J. Michael Fitzpatrick and John D. Crocetti, Department of Electrical Engineering and Computer Science, School of Engineering, Vanderbilt University, Nashville, TN,2000-2011.

4. Introduction to Matlab: Application to Electrical Engineering by HoussemRafik El Hana Bouchekara, Umm El Qura University, Februray2011.

5. A Matlab Tutorial by Dr. L. Doyle and Dr. A. Kokaram, Department of Electronic and Electrical Engineering, University of Dublin Trinity College,2000.

6. Electronics and circuit analysis using MATLAB by John. O. Attia, Department of Electrical Engineering, Prairie View A&M University, Boca Raton London, New York, Washington D.C., CRC Press,1999.

7. MATLAB for Electrical and Computer Engineering, Students and Professionals *with* Simulinkby Roland Priemer, University of Illinois at Chicago, Scitechpub.com, Edison, NJ,2013.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Program / Semester: **B.Tech (VI)**	Branch: **Humanities**
Subject: **Technical Communication & Soft Skills**	Course Code: **C000601(046)**
Total Marks (Internal Assessment): 10	L: 0 T:0 P: 2 Credit(s): 0
Internal Assessments to be conducted: 02	Duration (End Semester Exam): **NA**

UNIT-1 Communication Skills-Basics: Understanding the communicative environment, Verbal Communication; Non Verbal Communication & Cross Cultural Communication, Body Language & Listening Skills; Employment Communication&writing CVs, Cover Letters for correspondence.Common errors during communication, Humour in Communication.

UNIT-2 Interpersonal communication: Presentation, Interaction and Feedbacks, Stage Manners, Group Discussions (GDs) and facing Personal Interviews, Building Relationships, Understanding Group Dynamics- I, Emotional and Social Skills, Groups, Conflicts and their Resolution, Social Network, Media and Extending Our Identities.

UNIT- 3 Vocational skills: Managing time: Planning and Goalsetting, managing stress: Types of Stress; Making best out of Stress, Resilience, Work-life balance, Applying soft-skills to workplace.

UNIT-4 Mindsets and Handling People: Definitions and types of Mindset, Learning Mindset, Developing Growth Mindset, Types of People, How to Lead a Meeting, How to Speak Effectively in Meetings, Behavior & Roles in Meetings, Role Play: Meeting.On Saying "Please", How to say "NO".

UNIT-5Positive Pschycology: Motivating oneself, Persuasion, Survival Strategies, Negotiation, Leadership and motivating others**,** controlling anger**,** Gaining Power from Positive Thinking.

Text Books:

1. Petes S. J., Francis. Soft Skills and Professional Communication. New Delhi: Tata McGraw-Hill Education, 2011.
2. Stein, Steven J. & Howard E. Book. The EQ Edge: Emotional Intelligence and Your Success. Canada: Wiley & Sons, 2006.
3. Dorch, Patricia. What Are Soft Skills? New York: Execu Dress Publisher, 2013.

Reference Books:

- Kamin, Maxine. Soft Skills Revolution: A Guide for Connecting with Compassion for Trainers, Teams, and Leaders. Washington, DC: Pfeiffer & Company, 2013.
- Peale Norman Vincent. The Power of Positive Thinking: 10 Traits for Maximum Result. Paperback Publication. 2011.
- Klaus, Peggy, Jane Rohman& Molly Hamaker. The Hard Truth about Soft Skills. London: Harper Collins E-books, 2007.

Course Outcomes

1. Learn to listen actively to analyse audience and tailor the delivery accordingly.
2. Increase their awareness of communication behaviour by using propriety-profiling tool.
3. Master three "As" of stressful situation: Avoid, Alter, Accept; to cope with stressors and create a plan to reduce or eliminate them.
4. Develop growth mind-set and able to handle difficult person and situations successfully.
5. Develop technique of turning negativity into positivity and generate self-motivation skills.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch**: Electrical Engineering** Semester**: VI**
Subject: **Fiber Optics (Professional Elective-II)** Code: **C024631(024)**
Periods per week (L-T-P):**(3-1-0)** Credits**: 04**
Number of class Test to be conducted: **2 (Minimum)** No. of assignment to be submitted: 2
Scheme of Examination (Theory): **Total Marks-150 [ESE-100, CT-20, TA-30]**

COURSE OUTCOMES: After successful completion of this course, the student will able to:

Course Code	CO Statement	Knowledge Level
1	Illustrate the components materials used for preparation of optical fibre.	2
2	Analyze various characteristics of a signal or a system	4
3	Analyze a given optical fibre with different characteristics.	4
4	Design an economical Optical fibre for communication system.	5
5	Explain Optical fibre for various communication system.	2

COURSE DETAILS:

UNIT I Introduction to optical communication, principle of light transmission, optical fiber modes and configuration, mode theory for circular wave guides, single mode fibers, multimode fibers, numerical aperture, mode field diameter, fiber material, fiber fabrication techniques.

UNIT II Optical sources, LEDs, LASER diodes, Modal reflection noise, Power launching and coupling, Population inversion, Fiber splicing, Optical connectors, Photo detectors, PIN, Avalanche detectors, Response time, Avalanche multiplication noise.

UNIT III Signal degradation in optical fibers, attenuation losses, Signal distortion in optical wave guides, material dispersion, Wave guide dispersion, Chromatic dispersion, Intermodal distortion, Pulse broadening in graded index fiber, mode coupling, fiber design.

UNIT IV Coherent optical fiber communication, Modulation techniques for homodyne and heterodyne systems, Optical fiber link design, Rise time budget and link power budget, Long haul systems, Bit error rate, Line coding, NRZ,RZ, Block codes, Eye pattern.

UNIT V Advanced system techniques, Wavelength division multiplexing, Optical amplification, Semiconductoramplifier, EDFA comparison between semiconductor and optical amplifier, Gain bandwidth,Photonic switching ,Optical networks ,Optical fiberbus, Ring topology, Star architecture, FDDI and SONET standards.

Text Books:

1. Optical Fiber Communication, Gerd Keiser, Mc Graw Hill InternationalEd
2. Optical Fiber Communication, A.K. Ghatak&K.Tyagarajan.
3. OpticalFibre Communication: Principals and Techniques", John M. Senior, PHI NewDelhi

Reference Books:

1. Fibre Optics: Principles and Applications, N.S. Kapany, Academic Press, NewYork.
2. FibreOptics System Network Applications, Terry Edwards, John Wiley &Sons
3. Fibre Optics Test & Measurements, Dennis Drickson, Prentice Hall PTR, NJUSA.
4. Fibre Optic Communication Technology, D. Jafar, K. Mynbaev& Lowell L. Schenier, Pearson Education, Asia.it'sApplications, S.C. Gupta, PHIIndia

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch**: Electrical Engineering** Semester**: VI**

Subject: **Microcontroller and Embedded System(Professional Elective-II)** Code: **C024632(024)**

Periods per week (L-T-P):**(2-1-0)** Credits**: 03**

Number of class Test to be conducted: **2 (Minimum)** No. of assignment to be submitted: 02(Minimum)

Scheme of Examination (Theory): **Total Marks-150 [ESE-100, CT-20, TA-30]**

COURSE OUTCOMES: After successful completion of this course, the student will able to:

Course Code	CO Statement	Knowledge Level
1	Compare elements of Microcontroller family, and understand pin configuration of 8051	2
2	Interpret the architecture, various instructions and their application in programming of microcontroller 8051	2
3	Apply the knowledge of counters and interrupts to make programs for external interrupts	3
4	Illustrate different Protocols of serial communication in microcontroller 8051	2
5	Explain different categories, requirements and applications of embedded system	2

COURSE DETAILS:

UNIT I Introduction to Microcontroller: A brief History of Microcontrollers, Harvard Vs Von-Neumann Architecture, RISC Vs CISC, Classification of MCS-51family based on their features (8051, 8052, 8031, 8751, AT89C51), Pin configuration of 8051

UNIT II 8051 Processor Architecture and Instruction Set: Internal block diagram, Registers of 8051, Inbuilt RAM, Register banks, stack, on-chip and external program code memory ROM, power reset and clocking circuits, I/O port structure, Addressing modes, Instruction set and simple programming

UNIT IIICounter/Timer and Interrupts of 8051: Introduction, Registers of timer/counter, Different modes of timer/counter, Timer/counter programming, Interrupt Vs Polling, Types of interrupts and vector addresses, register used for interrupts initialization, programming of external interrupts, Timer interrupts.

UNIT IV Asynchronous Serial Communication: Introduction to serial communication, Types,RS232 standard, RS422 Standard, 1488 and 1489 standard, GPIB, Max 232/233Driver

UNIT V Overview of Embedded System: Embedded System, Categories of Embedded System, Requirements of Embedded Systems, Challenges and Issues in Embedded Software Development, Applications of Embedded Systems in Consumer Electronics, Control System, Biomedical Systems, Handheld computers, Communication devices.

Name of Text Books:

1. The 8051 Microcontroller and Embedded Systems using Assembly and C, Mazidi, Mazidi& McKinlay,2nd Ed.,PHI.

2. The 8051 Microcontroller", Kenneth J. Ayala, 3rd Edition, Thomson/Cengage Learning.

Name of Reference Books:

1. Microcontrollers: Architecture, Programming, Interfacing and System Design, Rajkamal, Pearson Education

2. Programming for Embedded Systems- Dreamtech Software Team, Wiley Dreamtech

3. Programming and Customizing the 8051 Microcontroller, Predko; TMH

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Electrical Engineering** Semester: **VI**
Subject: **Hybrid Electric Vehicles (Professional Elective-II)** Code: **C024633(024)**
Periods per week (L-T-P) :(**2-1-0)** Credits: **03**
Number of class Test to be conducted: **2 (Minimum)** No. of assignment to be submitted: **05**
Scheme of Examination (Theory): **Total Marks-150 [ESE-100, CT-20, TA-30]**

COURSE OUTCOMES: After successful completion of this course, the student will able to:

CO	Statement	Knowledge Level
CO-1	Choose a suitable drive scheme for developing an electric hybrid vehicle depending on resources	1
CO-2	Illustrate andexplain basic schemes of electric vehicles and hybrid electric vehicles.	2
CO-3	Choose proper energy storage systems for vehicle applications	3
CO-4	Classify various communication protocols and technologies used in vehicle networks.	4
CO-5	Interpretation of different energy storage system.	5

UNIT-I Introduction to Hybrid Electric Vehicles:
History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics.

UNIT-II : Electric and Hybrid traction:
Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis .

UNIT-III Electric Drive-trains:
Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis .

UNIT-IV: Electric Propulsion System
Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives

UNIT-V: Energy Storage and Sizing the drive system:
Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Hybridization of different energy storage devices. Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics.

Text Books :
1.Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003

Reference Books :
1. James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003.
2. MehrdadEhsani, YimiGao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch**: Electrical Engineering** Semester**: VI**
Subject: **Digital Control Systems (Professional Elective - II)** Code: **C024634(024)**
Periods per week (L-T-P):**(2-1-0)** Credits**: 03**
Number of class Test to be conducted: **2 (Minimum)** No. of assignment to be submitted: 02
Scheme of Examination (Theory): **Total Marks-150 [ESE-100, CT-20, TA-30]**

COURSE OUTCOMES: After successful completion of this course, the student will able to:

Course Code	CO Statement	Knowledge Level
1	Apply z transform to convert analog filter into digital filter.	3
2	Analyze the performance of filters.	3
3	Apply sampling techniques used in the communication.	3
4	Design digital filters and control their performance.	6
5	the optimization problem in control system	2

COURSE DETAILS:

Unit 1 Z transform: Z transform, Relationship between the s-plane and the z-plane, Inverse z-transform, Properties of Z transform, applications of z-transform, Delayed z-transform, Modified z-transform, Design of digital control systems using Z transform, Characteristic equation of closed loop systems

Unit 2 State-space analysis: Analysis of sampled data systems, State equations of discrete data systems, Eigen values, Eigenvectors, State transition matrix, State diagram of discrete-data systems with zero order hold; Controllability, Observability.

Unit 3 Sampling Techniques: Sampling: Types of sampling, instantaneous sampling, natural sampling, flat top sampling, Sample and hold circuits, Reconstruction of signals, Sampling rate, Nyquist criteria for sampling, Aperture effect, Applications.

Unit 4 Control System Design: Design using state-space techniques, Stability tests using Bilinear transformation, Jury's stability test, Second method of Lyapunov, Root loci for digital control systems, design of discrete PID, PD and PI controllers, Effect of adding poles and zeros, Pole placement design techniques.

Unit 5 Optimum control system: Parametric optimization problem using second method of Lyapunov, Quardric optimal control problem, Performance indices, Linear Quadratic Regulator design.

Text Books:

1. D. C. Kuo, Digital Control Systems, Oxford University Press, 2/e, Indian Edition, 2007.
2. K. Ogota, Discrete Time Control Systems, Prentice Hall, 2/e, 1995.
3. Madan Gopal, Digital Control and State Variable Methods.

Reference Books:

1. "Modern control engineering", Roy Choudhary, PHI.
2. "Control System Analysis and Design",K K Agarwal.
3. "Control Engineering Theory and Practice",M N Bandhopadhyay, PHI.
4. "Introduction to Control Engg. Model, Analysis and Design", Ajit K Mandal, New Age International Publishers.
5. I J Nagrath and M Gopal; New Age international Publishers, Forth Edition