

B. VOC

In

ELECTRONICS MANUFACTURING SERVICES(UGC)

Program Learning Outcomes:

- PLO1: Diagnose and repair all major electronics system
- PLO2: Document repairs of electronic goods accurately and descriptive of concern cause and correction
- PLO3: Effectively locate and utilize technical information required for the repair of electronic gadgets
- PLO4: Work safely and responsibly within shop standards and environmental guidelines
- PLO5: Demonstrate a comprehensive understanding of electronic components, their functions, and applications in various electronic products.
- PLO6: Acquire the ability to design and analyze electronic circuits for different functionalities.
- PLO7: Gain proficiency in electronic manufacturing processes, including PCB assembly, soldering, testing, and quality control.
- PLO8: Develop skills in operating and maintaining electronic manufacturing equipment and machinery.
- PLO9: Understand the principles of supply chain management in the electronics industry, including procurement, inventory control, and logistics

Maulana Abul Kalam Azad University of Technology, West Bengal
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(Effective for Academic Session 2024-2025)

TOTAL DURATION OF COURSE: 3 Years

- ✓ After completion of Year - 1 Diploma is awarded.
- ✓ After completion of Year - 2 Advance Diploma is awarded.
- ✓ After completion of Year - 3 B. VOC Degree is awarded.

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Year - 1 - Diploma (SEMESTER - I)
Corresponding NSQF Level 5

Course	Component	Theory / Practical / Sessional	Internal (Theory/Skill)	External (Theory/Skill)	Internal (Practical)	External (Practical / Sessional)	Credit		
							L	T	P
UGEN - 101 ENGLISH LANGUAGE AND COMMUNICATIVE SKILLS	Generic	Theory	30	70	-	-	3	1	-
UEMSV - 101 FUNDAMENTAL OF ELECTRICAL	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 102 PRINCIPLE OF ELECTRONICS	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 191 FUNDAMENTAL OF ELECTRICAL LAB	Skill	Practical	-	-	40	60	-	-	3
UEMSV - 192 PRINCIPLE OF ELECTRONICS LAB	Skill	Practical	-	-	40	60	-	-	3
UEMSV - 193 IDENTIFICATION OF COMPONENTS, TOOLS, EQUIPMENT, SOLDERING & DE - SOLDERING TECHNIQUES (PRACTICAL)	Skill	Practical	-	-	40	60	-	-	4
UGEN - 181 ENGLISH LANGUAGE LAB	Generic	Sessional	-	-	-	100	-	-	2
UGEN - 182 COMPUTER FUNDAMENTALS & IT	Generic	Sessional	-	-	-	100	-	-	4

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Year - 1 - Diploma (SEMESTER - II)

Corresponding NSQF Level 5

Course	Component	Theory / Practical / Sessional	Internal (Theory/Skill)	External (Theory/Skill)	Internal (Practical)	External (Practical / Sessional)	Credit		
							L	T	P
UEMSV - 201 ELCTRONICS DEVICES & CIRCUITS	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 202 DIGITAL ELCTRONICS	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 203 ELECTRONIC MEASUREMENT & INSTRUMENTATION	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 291 ELCTRONICS DEVICES & CIRCUITS LAB	Skill	Practical	-	-	40	60	-	-	2
UEMSV - 292 DIGITAL ELCTRONICS LAB	Skill	Practical	-	-	40	60	-	-	2
UEMSV - 293 ELECTRONIC MEASUREMENT & INSTRUMENTATION LAB	Skill	Practical	-	-	40	60	-	-	2
UGEN - 281 SOFT SKILL & PERSONALITY DEVELOPMENT	Generic	Sessional	-	-	-	100	-	-	4
UGEN - 282 BUSINESS ANALYSIS: ENVIRONMENT, SALES & MARKETING	Generic	Sessional	-	-	-	100	-	-	4
UEMSV - 281 ON JOB TRAINING	Skill	Sessional	-	-	-	100	-	-	6

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Year - 2 - Advanced Diploma (SEMESTER - III)
Corresponding NSQF Level 6

Course	Component	Theory / Practical / Sessional	Internal (Theory/Skill)	External (Theory/Skill)	Internal (Practical)	External (Practical / Sessional)	Credit		
							L	T	P
UEMSV – 301 MICROPROCESSOR	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 302 AUDIO& VIDEO ENGINEERING	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 303 FUNDAMENTAL OF TROUBLESHOOTING ELECTRONIC EQUIPMENT	Skill	Theory	30	70	-	-	3	1	-
UEMSV – 391 MICROPROCESSOR LAB	Skill	Practical	-	-	40	60	-	-	2
UEMSV - 392 AUDIO& VIDEO ENGINEERING LAB	Skill	Practical	-	-	40	60	-	-	2
UEMSV - 393 FUNDAMENTAL OF TROUBLESHOOTING ELECTRONIC EQUIPMENT LAB	Skill	Practical	-	-	40	60	-	-	4
UGEN - 381 VALUE EDUCATION & HUMAN RIGHTS	Generic	Sessional	-	-	-	100	-	-	4
UGEN – 382 BASIC ACCOUNTING	Generic	Sessional	-	-	-	100	-	-	4

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Year - 2 - Advanced Diploma (SEMESTER - IV)
Corresponding NSQF Level 6

Course	Component	Theory / Practical / Sessional	Internal (Theory/Skill)	External (Theory/Skill)	Internal (Practical)	External (Practical / Sessional)	Credit		
							L	T	P
UEMSV – 401 PC SOFTWARE	Skill	Theory	30	70	-	-	3	1	-
UEMSV – 402 MOBILE & SMART PHONE	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 403 TROUBLESHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENT – I	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 491 PC SOFTWARE LAB	Skill	Practical	-	-	40	60	-	-	2
UEMSV - 492 MOBILE & SMART PHONE LAB	Skill	Practical	-	-	40	60	-	-	2
UEMSV - 493 TROUBLESHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENT LAB– I	Skill	Practical	-	-	40	60	-	-	2
UGEN - 481 ENVIRONMENTAL STUDIES	Generic	Sessional	-	-	-	100	-	-	4
UGEN - 482 QUALITY MANAGEMENT	Generic	Sessional	-	-	-	100	-	-	4
UEMSV – 481 ON JOB TRAINING	Skill	Sessional	-	-	-	100	-	-	6

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Year - 3 - Degree (SEMESTER - V)

Corresponding NSQF Level 7

Course	Component	Theory / Practical / Sessional	Internal (Theory/Skill)	External (Theory/Skill)	Internal (Practical)	External (Practical / Sessional)	Credit		
							L	T	P
UEMSV - 501 COMMUNICATION ENGINEERING	Skill	Theory	30	70	-	-	3	1	-
UEMSV - 502 TROUBLESHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENT – II	Skill	Theory	30	70	-	-	3	1	-
UEMSV – 591 COMMUNICATION ENGINEERING LAB	Skill	Practical	-	-	40	60	-	-	4
UEMSV - 592 TROUBLESHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENT LAB – II	Skill	Practical	-	-	40	60	-	-	4
UEMSV – 593 MINOR PROJECT	Skill	Practical	-	-	40	60	-	-	6
UGEN - 581 INDIAN ECONOMY & SOCIAL CHANGES	Generic	Sessional	-	-	-	100	-	-	4
UGEN - 582 RESEARCH METHODOLOGY	Generic	Sessional	-	-	-	100	-	-	4

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Year - 3 - Degree (SEMESTER - VI)
Corresponding NSQF Level 7

Course	Component	Theory / Practical / Sessional	Internal (Theory)	External (Theory/Skill)	Internal (Practical/Skill)	External (Practical / Sessional)	Credit		
							L	T	P
UGEN - 681 GENERAL HUMAN PSYCHOLOGY & HR MANAGEMENT	Generic	Sessional	-	-	-	100	-	-	4
UGEN - 682 ENTREPRENEURSHIP DEVELOPMENT PROGRAMME	Generic	Sessional	-	-	-	100	-	-	4
UEMSV - 681 INDUSTRIAL TRAINING	Skill	Sessional	-	-	-	100	-	-	14
UEMSV - 691 MAJOR PROJECT	Skill	Practical	-	-	40	60	-	-	8

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Year - 1 Diploma (SEMESTER - I)

Paper Title: UGEN – 101: ENGLISH LANGUAGE AND COMMUNICATIVE SKILLS

Course Objectives:

- Enhance students' ability to express ideas clearly, concisely, and coherently in both oral and written forms.
- Expand students' vocabulary, grammar, and pronunciation to facilitate effective communication.
- Encourage students to analyze information, evaluate arguments, and form independent judgments.
- Develop students' awareness and appreciation of different cultures through language study.

Course Outcomes:

CO1: Demonstrate proficiency in oral and written communication across various contexts, including academic, professional, and interpersonal settings.

CO2: Utilize critical thinking and problem-solving skills to analyze and interpret information, and to construct clear and coherent arguments.

CO3: Exhibit a strong command of English grammar, vocabulary, and pronunciation, enabling accurate and appropriate language use.

CO4: Demonstrate understanding and appreciation of diverse cultures, and effectively interact with people from different backgrounds.

UNIT - I

The Sentence and Its Structure - How to Write Effective Sentences - Phrases - What Are They? - The Noun Clauses - The Adverb Clause - The Relative Clause - How the Clauses Are Conjoined - Word - Classes and Related Topics - Understanding the Verb - Understanding the Auxiliary Verb - Understanding the Adverbs - Understanding the Pronoun - Prepositions.

UNIT - II

Spelling and Pronunciation - Pronunciation, The Tense and Related Topics - Presentness and Present Tenses - The Presentness of a Past Action - Interrogatives and Negatives - Negatives - How to Frame Questions - What's What? - Polite Expressions - Some Time Expressions - In Conversation – Letter Writing - Academic Assignments.

UNIT - III

Self - Assessment; Identifying Strength & Limitations; Habits, Will - Power and Drives, Developing Self - Esteem and Building Self - Confidence, Significance of Self - Discipline, Understanding Perceptions, Attitudes, and Personality Types, Mind - Set: Growth and Fixed, Values and Beliefs, Motivation and Achieving Excellence; Self - Actualization Need; Goal Setting, Life and Career Planning , Constructive Thinking, Communicating Clearly: Understanding and Overcoming barriers.

UNIT - IV

Active Listening, Persuasive Speaking and Presentation Skills, Conducting Meetings, Writing Minutes, Sending Memos and Notices; etiquette: Effective E - mail Communication; Telephone Etiquette, Body Language in Group Discussion and Interview.

Books Recommended:

- Dorch, Patricia. What Are Soft Skills? New York: Execu Dress Publisher, 2013.
- Kulbhushan Kumar, Effective Business Communications, Khanna Publishing House (AICTE Recommended-2018)
- Kamin, Maxine. Soft Skills Revolution: A Guide for Connecting with Compassion for Trainers, Teams, and Leaders. Washington, DC: Pfeiffer & Company, 2013.
- Klaus, Peggy, Jane Rohman & Molly Hamaker. The Hard Truth about Soft Skills. London: HarperCollins E - books, 2007.
- Petes S. J. , Francis. Soft Skills and Professional Communication. New Delhi: Tata McGraw - Hill Education, 2011.
- Stein, Steven J. & Howard E. Book. The EQ Edge: Emotional Intelligence and Your Success. Canada: Wiley & Sons, 2006.

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Paper Title: UGEN – 181 ENGLISH LANGUAGE LAB

Planning for Practical session: (Based on UGEN – 101)

- Conversation classes on contemporary issues
- Writing of corporate CVs
- PPT presentation on selected issues
- Group discussion
- Tips to face the interviews and mock sessions

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Paper Title: UEMSV – 101: FUNDAMENTAL OF ELECTRICAL

Job Role: Electronics Junior Technician

Course Objectives:

- Understand Basic Electrical Concepts: Provide students with a solid foundation in fundamental electrical concepts, including voltage, current, resistance, power, and energy, as well as Ohm's Law and Kirchhoff's Laws.
- Explore Electrical Circuits and Components: Introduce students to the basic components of electrical circuits (resistors, capacitors, inductors, switches) and their roles in circuit operation, as well as the principles of series and parallel circuits.
- Develop Skills in Circuit Analysis: Equip students with the ability to analyze simple electrical circuits using both theoretical methods and practical techniques, including the use of circuit analysis tools and software.
- Learn Electrical Measurement and Safety: Teach students the proper use of electrical measurement instruments (such as multimeters and oscilloscopes) and emphasize safety practices in electrical work to ensure safe handling and operation of electrical systems.

Course Outcomes:

CO1: Proficiency in Basic Electrical Concepts: Students will be able to demonstrate a clear understanding of fundamental electrical principles, including the ability to apply Ohm's Law and Kirchhoff's Laws to solve electrical circuit problems.

CO2: Knowledge of Electrical Circuits and Components: Students will be capable of identifying and describing the function of key electrical components and understanding their roles in different types of circuits, both in series and parallel configurations.

CO3: Competence in Circuit Analysis: Students will be proficient in analyzing and solving basic electrical circuits, utilizing theoretical methods and practical tools to determine circuit behavior and performance.

CO4: Effective Use of Measurement Tools and Adherence to Safety: Students will demonstrate the ability to use electrical measurement instruments accurately and adhere to safety practices in electrical work, ensuring both effective and safe handling of electrical systems.

UNIT - I

Current Electricity: Definition of Resistance, Voltage, Current, Power, Energy and their units, Relation between electrical, mechanical and thermal units, Temperature variation of resistance, Difference between AC and DC voltage and current.

D. C. Circuits: Ohm's Law, Series - parallel resistance circuits, calculation of equivalent resistance, Kirchhoff's Laws and their applications.

UNIT - II

Electric Cells: Primary cell, wet cell, dry cell, battery, Li - ion battery, series and parallel connections of cells, Secondary cells, Lead Acid Cell, Discharging and recharging of cells, preparation of electrolyte, care and maintenance of secondary cells.

Lighting Effects of Current: Lighting effect of electric current, filaments used in lamps, and Tube light, LED, their working and applications.

UNIT - III

Capacitors: Capacitor and its capacity, Concept of charging and Discharging of capacitors, Types of Capacitors and their use in circuits, Series and parallel connection of capacitors, Energy stored in a capacitor.

Electromagnetic Effects: Permanent magnets and Electromagnets, their construction and use, Polarities of an electromagnet and rules for finding them. Faraday's Laws of Electromagnetic Induction, Dynamically induced e. m. f. , its magnitude and induction, inductance and its unit. Mutually induced e. m. f. , its magnitude and direction, Energy stored in an inductance. Force acting on a current carrying conductor in magnetic field, its magnitude and direction, Principles and construction of dynamo.

UNIT - IV

A. C Circuits: Generation of A. C. voltage, its generation and wave shape. Cycle, frequency, peak value, R. M. S. value, form factor, crest factor, Phase difference, power and power factor, A. C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance, Q factor of R. L. C. series circuits.

Single Phase Transformer: Construction, principle, e. m. f equation, transformation ratio, various losses in transformation, testing of transformer with polarity testing, equivalent Ckt.

Measurements: Voltage, current & power measurements, Ammeter, Voltmeter, Watt meter, connection diagram & uses, 2 wattmeter methods.

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Books Recommended:

- Basic Electrical Engineering, Ritu Sahdev, Khanna Publishing House (AICTE Recommended Textbook-2018)
- Fundamentals of Electrical Engg. & Electronics, B. L. Theraja
- Electrical Science, Vandana Singhal
- Principle of Electrical Engineering, B. R. Gupta

Paper Title: UEMSV – 191 FUNDAMENTAL OF ELECTRICAL LAB

List of Experiments: (Based on UEMSV – 101)

- Introduction to Multimeter (Analog & Digital) and its use as Voltmeter (For AC & DC), Ammeter (For AC & DC) and Ohmmeter.
- Measurement of resistor and capacitor by using color code.
- Idea of variable resistance, project board & power supply.
- Measurement of resistance by voltage drops method.
- Series & Parallel combination of resistances.
- Practical on Ohm's Law.
- Practical on KVL
- Practical on KCL.
- Transformer:
 - Turns ratio measurement.
 - Voltage ratio measurement.
 - Resistance ratio measurement of 1 ry & 2 ry.
 - Loss measurement (Transformer test).
- Characteristics of Transformer

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Paper Title: UEMSV – 102: PRINCIPLE OF ELECTRONICS

Job Role: Electronics Junior Technician

Course Objectives:

- **Understand Fundamental Electronics Concepts:** Provide students with a foundational understanding of key electronics principles, including semiconductor physics, diodes, transistors, and operational amplifiers.
- **Explore Electronic Components and Their Functions:** Introduce students to various electronic components such as resistors, capacitors, inductors, diodes, and transistors, focusing on their functions, characteristics, and applications in electronic circuits.
- **Develop Skills in Electronic Circuit Design and Analysis:** Equip students with the ability to design and analyze simple electronic circuits, including both analog and digital circuits, using appropriate theoretical and practical methods.
- **Learn Application of Electronics in Real World Scenarios:** Teach students how to apply electronic principles and components to real world applications, such as signal processing, amplification, and switching, and to troubleshoot common electronic circuit problems.

Course Outcomes:

CO1: Proficiency in Electronics Concepts: Students will demonstrate a solid understanding of fundamental electronics principles, including the operation of semiconductors and key electronic components like diodes and transistors.

CO2: Knowledge of Electronic Components and Their Applications: Students will be able to identify and describe the functions of various electronic components and understand their role in different types of electronic circuits.

CO3: Competence in Circuit Design and Analysis: Students will be capable of designing and analyzing both analog and digital electronic circuits, applying theoretical knowledge to practical circuit design and problem solving.

CO4: Application of Electronics to Practical Problems: Students will effectively apply electronics principles to real world scenarios, including troubleshooting and optimizing electronic circuits for various applications.

UNIT - I

Overview of Atom: Sub - Atomic Particles and CRO, Brief History of Electronics. Atom and its elements, Electron, Force, Field intensity, Potential, Energy, current. Electric field, Magnetic field, Motion of charged particles in electric and magnetic field.

Voltage and Current: Resistance, Ohm's law, V - I Characteristics, Resistors, Capacitors, Inductors. Voltage and Current sources, Symbols and Graphical representation. Overview of AC, DC, Cells and Batteries, Energy and Power.

UNIT - II

Basics of Semiconductor: Semiconductor materials, Metals and Semiconductors and Photo - electric emission. N - type and P - type semiconductor, Effects of temperature on Conductivity of semiconductor. PN junction diode, depletion layer, Forward & Reverse bias, V - I Characteristic, Effects of temperature, Zener diode, Photo diode, LED, Tunnel Diode, Varactors Diodes, Schottky Diodes, Types and applications of diode. Diode as a rectifier, Half wave and full wave rectification, Zener diode Regulator. Introduction to Filters, Clippers, Clampers

UNIT - III

Bipolar Transistor: Transistor construction & operation of N - P - N & P - N - P. Common base (CB), common emitter (CE), common collector (CC) configurations. Biasing of transistors, V - I characteristics of CB, CE & CC, comparison of CB, CE & CC. Configuration with respect to I/P & O/P dynamic resistance, current gain and leakage current. α , β , γ relation. Application of CB, CE & CC configurations. Transistor as an amplifier (simple form), Transistor D. C load line.

Field Effect Transistor: JFET construction, principle and operation. MOSFET construction, principle and operation. Characteristics of JFET & MOSFET, relation between them. Definition of drain resistance, transconductance, amplification factor. JFET as a switch, typical application of JFET & MOSFET.

Uni - junction Transistor: Construction, principles of operation & characteristics of UJT. Equivalent circuit. Comparison between FET and UJT. Typical application of UJT.

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UNIT - IV

Transistor Amplifier and Applications: Introduction, Single and Multi - stage amplifiers, Introduction to Oscillators: Thyristor Construction, principle of operation & characteristics of SCR, DIAC, TRIAC & their uses.

Opto Electronics: Elementary idea of LDR, LED, Photo Diode, Photo Transistor, Solar cell & Opto Coupler.

Books Recommended:

- Principle of Electronics, V. K. Mehata.
- Fundamentals of Electronics, D. Chattopadhyay / P. C Rakshit
- Basic Electronics, S. Biswas, Khanna Publishing House

Paper Title: UEMSV - 192 PRINCIPLE OF ELECTRONICS LAB

List of Experiments: (Based on UEMSV – 102)

- Knowledge of electronics components- different types of R, L and C.
- Practical on Characteristic of P.N junction diode.
- Practical on Characteristic of Zener diode.
- Practical on half wave rectifier ckt (Ripple factor determination).
- Practical on Full wave rectifier ckt (Ripple factor determination).
- Practical on Characteristic of transistor (CB /CE /CC) type.
- Practical on Characteristic of JFET.
- Practical on Characteristic of MOS-FET.
- Practical on Characteristic of UJT.
- Practical on Characteristic of LED
- Practical on Characteristic of Opto-Coupler

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Paper Title: UEMSV – 193: IDENTIFICATION OF COMPONENTS, TOOLS, EQUIPMENT, SOLDERING & DE - SOLDERING TECHNIQUES (PRACTICAL)

Job Role: Electronics Junior Technician

Course Objectives:

- **Identify Electronic Components and Tools:** Provide students with the knowledge to accurately identify and describe various electronic components (e.g., resistors, capacitors, diodes, transistors) and the tools used in electronic assembly and repair.
- **Understand and Use Soldering Techniques:** Teach students the fundamentals of soldering, including the proper techniques for making reliable solder joints, using soldering irons, and selecting appropriate solder materials.
- **Master De Soldering Techniques:** Equip students with the skills to effectively desolder components from printed circuit boards (PCBs), using tools and techniques to ensure minimal damage to the PCB and surrounding components.
- **Apply Practical Skills in Electronic Assembly and Repair:** Enable students to apply their knowledge in practical scenarios, including assembling electronic circuits, performing repairs, and ensuring the functionality and reliability of assembled circuits.

Course Outcomes:

CO1: Proficiency in Identifying Components and Tools: Students will be able to correctly identify a range of electronic components and tools, understanding their functions and applications in electronic assemblies and repairs.

CO2: Competence in Soldering Techniques: Students will demonstrate effective soldering techniques, producing high quality solder joints that meet industry standards and ensuring reliable electrical connections.

CO3: Skillful De Soldering: Students will be proficient in desoldering components from PCBs, using appropriate techniques and tools to safely remove components without damaging the board or adjacent parts.

CO4: Effective Application of Assembly and Repair Skills: Students will be capable of applying their practical skills to assemble electronic circuits, perform troubleshooting, and carry out repairs, ensuring that electronic systems are functional and reliable.

UNIT - I

Main components & modules/ sub - assemblies of electronic equipment: Control Panel (System Controller), Keypads, Door and Window Contacts, Motion Detectors, Glass Break Detection, Smoke Detectors, Heat Sensors, Carbon Monoxide Detectors, Water Detectors (or Water Bug), Temperature Sensors, Capacitance switches / control push buttons & rotary switches

UNIT - II

Introduction to wireless communication: Signal Converters, Tools & their Uses, Use of tester to monitor AC Power, Skin the electrical wires/cables using the wire stripper and cutter, Main cable for control & electronic circuit wires, Crimping tools and buses

Introduction to measuring equipment's: Signal generator's, CRO, Function Generators, Frequency Counter, Logic analyzer, LCRQ Meter.

UNIT - III

Soldering & De Soldering of Basic Components: Soldering Tools, Different types of Soldering Guns related to Temperature and wattages, types of tips, Solder materials and their grading, Soldering and De Soldering Stations and their Specifications, Preparing Component for Soldering, PCB Applications, Types of PCB, Soldering Basic Components on PCB, De soldering Basic Components, Safety precautions while Soldering & De soldering, Check for cold continuity of PCB, Identification of loose/dry solder, broken tracks on printed wire assemblies & discrete components mounted circuit boards, Join the broken PCB track and test, De soldering using Pump and wick, Introduction of SMD Components.

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UNIT - IV

Introduction to SMD Components: Identification of 2, 3, 4 terminal SMD components, Soldering the SMD components on the PCB, Make the necessary settings on SMD soldering station to solder various ICs of different packages by choosing proper clamping tools, Identify various connections and the setup required for SMD soldering station, De solder the SMD components from the given PCB, Make the necessary settings on SMD soldering station to de solder various ICs of different packages by choosing proper clamping tools, Make a panel board using different types of switches for a given application, Identification of crimping tools for various IC packages, Reliable Soldering Practices

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Paper Title: UGEN – 182: COMPUTER FUNDAMENTALS & IT

Course Objectives:

- To introduce students to the fundamental concepts of computers and information technology. This includes understanding computer hardware, software, and their interconnections.
- To develop basic computer skills: Students will learn to operate computer systems, use productivity software, and access information resources effectively.
- To foster digital literacy: Students will be equipped with the knowledge and skills to use computers and information technology responsibly and ethically.
- To prepare students for further studies: This course will lay the foundation for advanced computer courses and IT-related fields.

Course Outcomes:

CO1: Demonstrate basic computer hardware knowledge: Students will be able to identify and describe the components of a computer system and their functions.

CO2: Utilize computer software effectively: Students will be proficient in using operating systems, word processors, spreadsheets, and presentation software.

CO3: Access and utilize information resources: Students will be able to search for, evaluate, and use information from various digital sources.

CO4: Apply digital literacy skills: Students will demonstrate responsible and ethical use of computers and information technology.

UNIT - I

KNOWING COMPUTER: Introduction, Objectives, Basic Applications of Computer, Components of Computer System: Central Processing Unit, Keyboard, mouse and VDU, Other Input devices, Other Output devices, Computer Memory. Concept of Hardware and Software: Hardware, Software: Application Software, Systems software. Concept of computing, data and information. Bringing computer to life: Connecting keyboard, mouse, monitor and printer to CPU, Checking power supply.

UNIT - II

OPERATING COMPUTER USING GUI BASED OPERATING SYSTEM: Introduction, Objectives, Basics of Operating System: Operating system, Basics of popular operating system (LINUX, WINDOWS). The User Interface: Task Bar, Icons, Menu, Running an Application. Operating System Simple Setting: Changing System Date And Time, Changing Display Properties, To Add Or Remove A Windows Component, Changing Mouse Properties, Adding and removing Printers. File and Directory Management: Creating and renaming of files and directories, Common utilities.

UNIT - III

INTRODUCTION TO INTERNET, WWW AND WEB BROWSERS: Introduction, Objectives. Basic of Computer Networks: Local Area Network (LAN), Wide Area Network (WAN). Internet: Concept of Internet, Applications of Internet, Connecting to the Internet, Troubleshooting, World Wide Web (WWW), Web Browsing Software, Popular Web Browsing Software. Search Engines: Popular Search Engines / Search for content, Accessing Web Browser, Using Favorites Folder, Downloading Web Pages, Printing Web Pages. Understanding URL, Surfing the web: Using e - governance website.

UNIT - IV

COMMUNICATIONS AND COLLABORATION: Introduction, Objectives, Basics of E - mail: What is an Electronic Mail, Email Addressing, Using E - mails: Opening Email account, Mailbox: Inbox and Outbox, Creating and Sending a new E - mail, Replying to an E - mail message, Forwarding an E - mail message, Sorting and Searching emails. Introduction to MS - Office: MS - Word, MS - Excel, MS - Power Point.

Books Recommended:

- Computer Fundamentals, R.S. Salaria, Khanna Publishing House (AICTE Recommended Textbook – 2018)
- Handbook of Computer Fundamentals, N.S. Gill, Khanna Publishing House (AICTE Recommended Textbook – 2018)
- Fundamentals of Computers, V. Rajaraman, PHI Publication
- Computer Fundamentals, P. K. Sinha, BPB Publication
- Introduction to Computers with MS - Office 2007, Leon, TMH Publication

Maulana Abul Kalam Azad University of Technology, West Bengal
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B.Voc. in Electronics Manufacturing Services (UGC)
(Effective for Academic Session 2024-2025)
Year - 1 Diploma (SEMESTER - II)

Paper Title: UEMSV – 201: ELCTRONICS DEVICES & CIRCUITS

Job Role: Electronics Junior Technician

Course Objectives:

- Understand Electronic Devices: Provide students with a comprehensive understanding of key electronic devices, including diodes, transistors, and integrated circuits, focusing on their operation, characteristics, and applications.
- Explore Analog and Digital Circuit Design: Introduce students to the principles of designing both analog and digital circuits, including the use of electronic devices to create functional and efficient circuit designs.
- Develop Skills in Circuit Analysis and Simulation: Equip students with the skills needed to analyze and simulate electronic circuits, using theoretical methods and computer aided design (CAD) tools to predict circuit behavior and performance.
- Apply Practical Circuit Building and Testing Techniques: Teach students practical techniques for building and testing electronic circuits, including prototyping on breadboards, soldering components, and using measurement tools to verify circuit functionality.

Course Outcomes:

CO1: Proficiency in Electronic Devices: Students will be able to describe the operation, characteristics, and applications of various electronic devices, such as diodes, transistors, and integrated circuits.

CO2: Competence in Circuit Design: Students will demonstrate the ability to design and analyze both analog and digital circuits, using electronic devices effectively to achieve desired circuit functions and performance.

CO3: Skills in Circuit Analysis and Simulation: Students will be proficient in analyzing and simulating electronic circuits using theoretical approaches and CAD tools, predicting circuit behavior and making necessary adjustments to optimize performance.

CO4: Effective Circuit Building and Testing: Students will be capable of constructing and testing electronic circuits, using practical techniques to assemble, solder, and verify circuit functionality, ensuring that designs work as intended.

UNIT - I

Rectifier & Regulated Power Supply: Half wave, full wave rectifier, different types of filters (C, CR, LC & π), ripple factor, peak inverse voltage, transformer utilization factor and regulation, expression for rectifier efficiency and ripple factor, voltage doubler and tripler, voltage limiter. Regulated power supplies - D. C. voltage stabilizer using Zener diode, D. C. series voltage regulator, IC regulator.

Transistor biasing & operating point of stabilization: Selection of operating point, need for bias stabilization, biasing methods battery bias, fixed bias, collector to base bias, self bias, stability and bias compensation. Thermal runaway and its prevention, heat sinks.

UNIT - II

Small signal transistor & special purpose Amplifiers: Transistor amplifier circuit operation using D. C. & A. C. load line. Transistor amplifier circuits : - two port and hybrid (h) parameters, amplifier analysis for current, voltage and power gain, I/P and O/P impedance, comparison of CB, CE and CC amplifier configurations, Miller's theorem. Darlington emitter follower. JFET amplifiers - JFET parameters, small signal models for low and high frequency operations. Common - source, common drain and common gate (CS, CD and CG) configurations. Biasing of JFET and enhancement MOSFET, JFET as voltage dependent resistor.

Multistage amplifiers: Cascading of amplifiers (Direct Coupled, RC coupled, transformer coupled), their gain, frequency response, input and output impedance, gain - bandwidth characteristics.

Distortion: Non - linear, frequency and phase shift in amplifiers.

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UNIT - III

Feed back & Tuned Amplifier: Feed back in amplifiers, feed back networks, effect of negative feed back on gain, input and output resistance, distortion, frequency response, band width and noise performance of amplifiers. Typical amplifier circuits using feed back.

Tuned amplifiers - Classification (narrow band and broad band single, double, stagger and tuned amplifiers). Quality factor and parallel response single and double tuned amplifiers.

Large signal Amplifiers: Class A, B, AB and C operation. Class A power amplifier, harmonic distortion. Transformer coupled audio amplifier, impedance matching, maximum power output and efficiency. Push pull amplifiers, merits and drawbacks of push - pull operation, class B and AB operation. Push - pull amplifier without output transformer. I. C. driver stage for power amplifier.

UNIT - IV

Oscillators & Multivibrators: Classification of oscillators. Use of positive feed back, negative resistance for generation of oscillations. Barkhausen criterions for oscillators. Different oscillator circuits i. e. tuned collector, tuned base, Hartley, colpitts, RC phase shift, wien bridge, crystal and negative resistance (tuned diode) oscillators. General idea of different wave shapes, diode clipping and clamping circuits. Astable, mono - stable and bi - stable multivibrators. Using IC 555 in multivibrators. Schmitt trigger. Square wave and triangular wave generators.

Differential Amplifier: Introduction, Operation in detail, different modes of operation, advantages & typical application.

OP - AMP: OP - AMP characteristics, inverting & non - inverting OP - Amps. Different OP - AMP, CMRR, OP - AMP as an adder, subtractor, scale changer, phase shifter. Voltage follower, integrator, differentiator, voltage to current & current to voltage converters. OP - AMP active filter, low pass, high pass and band pass filters.

Books Recommended:

- Integrated Electronics. J. Mill man & Haking
- Electronics Device & Circuits, Mottershed
- Electronics Principles, Devices & Circuits, M. L. Anand
- Analog Electronics, A.K. Maini, Khanna Publishing House (AICTE Recommended Textbook)

Paper Title: UEMSV – 291 ELCTRONICS DEVICES & CIRCUITS LAB

List of Experiments: (Based on UEMSV – 201)

- Transistor biasing
- Single Stage transistor amplifier
- UJT as a Relaxation oscillator
- Inverting Amplifier and adder using Op-amp IC 741
- Subtractor and Comparator using Op-amp IC 741
- Differentiator and integrator using Op-amp IC 741
- Series resonance circuit
- Parallel resonance circuit
- Hartley oscillator circuit
- Colpitt oscillator circuit
- Low pass active filter
- High pass Active filter
- Calculation of efficiency of a class A amplifier
- R-C coupled transistor amplifier

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Paper Title: UEMSV – 202: DIGITAL ELCTRONICS

Job Role: Electronics Junior Technician

Course Objectives:

- **Understand Digital Logic Fundamentals:** Provide students with a foundational understanding of digital logic principles, including binary numbers, Boolean algebra, and logic gates, as well as their applications in digital circuits.
- **Explore Combinational Logic Circuits:** Introduce students to the design and analysis of combinational logic circuits, including multiplexers, demultiplexers, encoders, decoders, and arithmetic circuits.
- **Study Sequential Logic Circuits:** Equip students with knowledge of sequential logic circuits, including flipflops, counters, and registers, and how they are used to design and implement state machines and memory elements.
- **Develop Skills in Digital Circuit Design and Implementation:** Teach students how to design, implement, and test digital circuits using both hardware description languages (HDLs) and practical tools such as digital logic simulators and prototyping boards.

Course Outcomes:

CO1: Proficiency in Digital Logic Principles: Students will demonstrate a thorough understanding of digital logic fundamentals, including the ability to perform binary arithmetic, apply Boolean algebra, and use logic gates to construct and analyze digital circuits.

CO2: Ability to Design Combinational Logic Circuits: Students will be capable of designing and analyzing combinational logic circuits, effectively utilizing multiplexers, demultiplexers, encoders, decoders, and arithmetic circuits to meet specific design requirements.

CO3: Competence in Sequential Logic Circuit Design: Students will be proficient in designing and analyzing sequential logic circuits, including the use of flipflops, counters, and registers, to create complex digital systems and state machines.

CO4: Skills in Digital Circuit Design and Testing: Students will effectively design, implement, and test digital circuits using HDLs and practical tools, demonstrating their ability to create functional digital systems and troubleshoot circuit issues.

UNIT - I

Number System: Binary, Decimal, Octal, Hexadecimal conversion from one Number System to another, Binary addition, subtraction, One's and Two's Compliment no. subtraction using 1's & 2's Compliment no. BCD Arithmetic, Codes: BCD, Excess - 3, Gray, ASCII, Error Code.

Logic Gate: Standard logic Gates (NOT/OR/AND/XOR/XNOR) it's characteristic. Universal logic gate (NAND/NOR).

UNIT - II

Boolean Algebra & Logic Family: Relation of Boolean algebra to switching elements and operation of logic gates. Obtaining a Boolean expression from a truth table. Definition of combination logic K - map method and its use. Graphical description of Boolean function. Brief idea (Fan in, Fan out, Propagation delay time, Voice margins) about: RTL, DTL, TTL, CMOS, Introduction of Logic gate IC's (TTL & CMOS).

Function of Logic ckt: Half adder, Full adder, Half Subtractor, Full Subtractor. Decoder & Encoder. Code converter. Multiplexer & De - multiplexer. Parity checkers / generator, comparator.

UNIT - III

Flip - Flops: Flip - Flop using basic gate. Construction of different ckts. a) R - S flip flop, b) T - flip flop, c) J - K flip flop, d) D - flip flop, e) Master Slave JK - flip flop.

Counter & Shift Registers: Asynchronous counter (Ripple). Synchronous counter (parallel). Up counter, Down Counter, Up - Down Counter, MOD - N - Counter. Presetable counter, Shift Reg. Parallel - in - serial - out (PISO). Shift registers function. Serial - in - serial - out (SISO), Shift Reg. Serial - in—parallel - out (SIPO), Shift Reg. Parallel - in - parallel - out (PIPO), Shift Reg. Shift & Ring counter. Application of Shift Reg.

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UNIT - IV

D/A and A/D conversion: Digital to Analog converter circuit. D/A application. Different method of A/D conversions: - Dual slope counter type, Successive approximation type.

Memory Organization: Characters and functions of: Different types of memory as semiconductor and magnetic, Read/Write memory (RAM) - Static & Dynamic Read only Memory (ROM), (PROM) - Fixed & Erasable (EPROM).

Books Recommended:

- Digital Circuits and Logic Design, S. Salivahanan
- Digital Electronics, S. Salivahanan
- Digital computer electronics, Malvino and Brown
- Digital Electronics, R. Anand, Khanna Publishing House (AICTE Recommended Textbook)

Paper Title: UEMSV – 292 DIGITAL ELCTRONICS LAB

List of Experiments: (Based on UEMSV – 202)

- Verification of logic gates
- Practical on half adder/half subtractor
- Practical on full adder/full subtractor
- Practical on multiplexer.
- Practical on De- multiplexer
- Practical on Decoder.
- Practical on Encoder.
- Practical on Flip Flop (RS flip flop, D – Flip Flop, J – K /T – Flip Flop)
- Practical on Shift register.
- Practical on Up – Counter.
- Practical on Down – Counter.
- Practical on Mod – N –Counter.
- Study of the Characteristics BCD to 7-segment decoder.

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Paper Title: UEMSV – 203: ELECTRONIC MEASUREMENT & INSTRUMENTATION

Job Role: Electronics Junior Technician

Course Objectives:

- **Understand Measurement Principles:** Provide students with a solid understanding of fundamental principles of electronic measurement, including accuracy, precision, resolution, and calibration techniques.
- **Explore Measurement Instruments:** Introduce students to a range of electronic measurement instruments, such as multimeters, oscilloscopes, signal generators, and spectrum analyzers, focusing on their operation, features, and applications.
- **Develop Skills in Measurement Techniques:** Equip students with practical skills in using measurement instruments to perform various electronic measurements, including voltage, current, resistance, frequency, and signal waveform analysis.
- **Apply Instrumentation in Practical Scenarios:** Teach students how to apply measurement and instrumentation techniques in real world scenarios, including troubleshooting electronic circuits, conducting experiments, and analyzing measurement data.

Course Outcomes:

CO1: Proficiency in Measurement Principles: Students will demonstrate a thorough understanding of measurement principles, including how to ensure accuracy, precision, and proper calibration of measurement systems.

CO2: Knowledge of Measurement Instruments: Students will be capable of identifying and describing the operation of various electronic measurement instruments, including their features, capabilities, and appropriate usage in different measurement tasks.

CO3: Competence in Measurement Techniques: Students will effectively use measurement instruments to carry out a range of electronic measurements, including accurately measuring voltage, current, resistance, frequency, and analyzing signal waveforms.

CO4: Application of Instrumentation in Real World Scenarios: Students will be able to apply their measurement and instrumentation skills to practical scenarios, such as troubleshooting electronic circuits, conducting laboratory experiments, and interpreting measurement data for effective analysis and problem solving.

UNIT - I

Principle of Instrumentation: Principle of operation of sensor and transducer and their applications. Transducer as a system component. Factors affecting the choice of transducer.

Measurement of Physical Quantity with Transducer: Displacement - Potentiometer, L. V. D. T. Strain gauge, Piezoelectric crystal, Velocity - Tachogenerator, Revolution Counter, Pressure -Manometer, elastic type - Bourdon tubes, diaphragm and Bellows. Temperature - RTD. Thermistors & Thermocouple, Flow - positive displacement, Electromagnetic, thermal heat.

UNIT - II

Signal condition: Signal conditioning requirements for DC & AC Transducer signal, Characteristics and application of bridges signal conditioning element. Specification and characteristics of Instrumentation amplifier.

Measurement Instruments: Galvanometer; Moving magnet & Moving coil type; Absolute & Secondary instruments. Operation of PMMC instruments, Construction extension of range -ammeter and voltmeter, Moving iron - Principle of operation types: Construction and operation of Electro dynamic watt meter , Ohmmeter, Megger - description , digital Multimeter - operating principle , types , advantages. Digital voltmeter.

UNIT - III

Impedance Bridge: DC Wheatstone bridge and its application , AC bridge - Maxwell's bridge , Hay's bridge , Schering bridge, Q - meter and RLCmeter - operation & construction.

Cathode Ray Oscilloscope: Block diagram of CRO, construction of CRT, description of different sections, features of Dual trace and Dual beam Oscilloscope, Digital storage Oscilloscope. Triggered & Non - triggered Oscilloscope; application of CRO - Phase & frequency measurement.

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UNIT - IV

Signal Generator: Block diagram of AF & RF signal Generator, function generator, sweep generator.

Calibration: Basic concepts of Calibration, Errors in measurement, Trace ability and standards for Electrical Parameters (Time & Frequency).

Books Recommended:

- Electronics Measurement & Instrumentation, A. K. Sahani
- Electronic Instrumentation, H. S. Kalsi
- Electronics Measurement & Measurement Technique, Cooper
- Electronic Measurement & Instrumentation, J.G. Joshi, Khanna Publishing House (AICTE Recommended Textbook)

Paper Title: UEMSV – 293 ELECTRONIC MEASUREMENT & INSTRUMENTATION LAB

List of Experiments: (Based on UEMSV – 203)

- Operational details of CRO
- Measurement of voltage (AC & DC) by using CRO
- Measurement of frequency of AC signal by using CRO
- Measurement of phase of AC signal by using CRO
- Use of PMMC galvanometer as Voltmeter
- Use of PMMC galvanometer as an Ammeter
- Measurement of Power consuming by a load using Wattmeter
- Measurement of unknown resistance using wheatstone bridge
- Identification of different type of Sensors and their functions
- Measurement of R,L,C using RLC meter
- Demonstration of working of Function generator
- Demonstration of different workings of DMM

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Paper Title: UGEN – 281: SOFT SKILL & PERSONALITY DEVELOPMENT

Course Objectives

- Enhance interpersonal communication: Develop students' ability to communicate effectively with diverse audiences, both verbally and non-verbally.
- Foster personal and professional development: Equip students with the necessary skills to build self-confidence, time management, and leadership qualities.
- Improve critical thinking and problem-solving: Enhance students' ability to analyze complex situations, make informed decisions, and find effective solutions.
- Develop teamwork and collaboration: Cultivate students' ability to work effectively in groups, share responsibilities, and achieve common goals.

Course Outcomes

- CO1:** Effective communication: Students will be able to communicate clearly, concisely, and persuasively in various settings.
CO2: Personal and professional growth: Students will demonstrate improved self-awareness, time management, and leadership skills.
CO3: Critical thinking and problem-solving: Students will be able to analyze problems, generate solutions, and make informed decisions.
CO4: Teamwork and collaboration: Students will effectively collaborate with others to achieve shared objectives.

UNIT - I

Listening Skills: Barriers to listening; effective listening skills; feedback skills. Attending telephone calls; note taking. Activities: Listening exercises - Listening to conversation, News and TV reports. Taking notes on a speech / lecture.

UNIT - II

Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics. The study of sounds of English, stress and intonation. Situation based Conversation in English.

UNIT - III

Essentials of Spoken English: Activities, Making conversation and taking turns, Oral description or explanation of a common object, situation or concept, Giving interviews.

UNIT - IV

Oral Presentation with / without audio visual aids. Group Discussion . Listening to any recorded or live material and asking oral questions for listening comprehension.

UNIT - V

Classroom technique to improve the soft skills, Surprise writing on current issues, General grooming sessions to face the interview, Group discussions, Motivational classes to improve communication and confidence power

Books Recommended:

- Soft skills Training - A workbook to develop skills for employment by Fredrick H. Wentz
- Personality Development and Soft skills , Oxford University Press by Barun K. Mitra

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Paper Title: UGEN – 282: BUSINESS ANALYSIS: ENVIRONMENT, SALES & MARKETING

Course Objectives:

- Analyze the Business Environment: Equip students with the tools and techniques to analyze the external and internal business environment, including market trends, economic conditions, regulatory frameworks, and competitive landscapes.
- Understand Sales Strategies and Techniques: Provide students with a deep understanding of various sales strategies and techniques, focusing on how to develop, implement, and assess sales plans that drive customer acquisition and revenue growth.
- Explore Marketing Principles and Practices: Introduce students to core marketing principles, including market research, segmentation, targeting, positioning, and the development of marketing strategies to effectively reach and engage target audiences.
- Integrate Sales and Marketing Analysis: Teach students how to integrate insights from sales and marketing analyses to create comprehensive business strategies that align with environmental factors and drive organizational success.

Course Outcomes:

CO1: Competence in Analyzing the Business Environment: Students will be able to analyze various aspects of the business environment, including market conditions, economic factors, and competitive dynamics, and understand their impact on business strategies.

CO2: Ability to Develop Sales Strategies: Students will demonstrate the ability to create and implement effective sales strategies, using data driven insights to optimize sales performance, customer acquisition, and retention.

CO3: Proficiency in Marketing Principles and Practices: Students will apply marketing principles to design and execute marketing strategies, including conducting market research, segmenting target markets, and positioning products or services effectively.

CO4: Integration of Sales and Marketing Insights: Students will be capable of integrating sales and marketing analyses to formulate cohesive business strategies that address environmental factors and contribute to overall business growth and success.

UNIT - I

Business Environment - Introduction, Concept of Business, Levels of the Business Environment, Understanding the Environment, Economic Environment of Business, The Global Economic Environment, Economic Policies, Business and Economic Policies, Socio Cultural Environment, Business and Society, Business and Culture , Indian Business Culture, Culture and Organizational Behavior. Introduction to Political Environment, Political Environment and the Economic system, Types of Political Systems, Indian Constitution and Business, Changing Profile of Indian Economy , Business Risks Posed by the Indian Political System, Economic Systems, Financial Environment: Introduction, An Overview of the Financial System, Components of Financial System, Financial Institutions and their Roles, Financial Institutions in India, Role of Foreign Direct Investment

UNIT - II

Introduction to Legal Environment, Laws Impacting Industry in India, Intellectual Property Rights, Major Regulations Pertaining to Business, Regulatory Role of Government, Promotional Role of Government, Participatory Role of Government, Conciliatory and Judicial Role of Government , Impact of India's Industrial Policy on Economic Reforms, New Economic Policy, Globalization. India, WTO and Trading Blocs, Levels of Economic Integration/Trading Blocs, Effects of Economic Integration, Major Regional Trading Blocs, Commodity Agreement, World Trade Organization, WTO and India, Corporate Social Responsibility: Introduction, Meaning and Definition, Need for social responsibility of business, Social responsibility of business towards different groups, Barriers to social responsibility, Social responsibility of business in India, Public, Private, Joint and Cooperative Sectors

UNIT – III

Traditional and Modern Concepts of Marketing; Selling vs. Marketing; Marketing mix; Marketing Environment. Market Segmentation & its implication. Concept of Product, Product Planning and Development; Packaging: Role and Functions; Brand name and Trade mark; Product Life Cycle Concept; Distributions Channels and Physical Distribution. Price: Importance of Price in the Marketing Mix; Factors affecting Price of a Product/Service; Discounts and Rebates. Methods of Promotion; Advertising Media; Characteristics of an effective Advertisement

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UNIT – IV

Salesmanship and Qualities of Salesman; Product knowledge; Customer knowledge: Buying Motives and Selling Points. Scientific Selling; Approach and Presentation: Methods of Approaching a Customer; Presentation Process and Styles; Presentation planning. Objection Handling: Types of objections; Handling customer objections. Closing Sales and Follow up: Methods of closing sale; Executing sales order; Follow-up; Sales Promotion Schemes: Sampling; Coupon; Price Off; Premium Plan; Consumer Contests and Sweeps Takes; POP Displays; Demonstration; Trade Fairs and Exhibitions; Sales Promotion Techniques and Sales Force.

UNIT – V

Study of international organization (WTO, WORLD BANK, IMF, AMA), Case studies on the recent Business Environment, Marketing, & Sales Promotion, PPT presentation on selected issues, Survey to collect the samples for project work

Books Recommended:

- Business Environment; By T. R. Jain, Mukesh Trehan, Ranju Trehan, VK Global Publications.
- Business Environment; By Vishwajeet Prasad, Gyan Publishing House.
- Business Environment; By Saleem, Pearson Education India.
- BUSINESS ENVIRONMENT; By VEENA KESHAV PAILWAR, PHI Learning Pvt. Ltd.
- Business Environment, by Suresh Bedi, Excel Books
- BUSINESS ENVIRONMENT: INDIAN AND GLOBAL PERSPECTIVE; FAISAL AHMED, M. ABSAR ALAMM, PHI Learning Pvt. Ltd.
- Principles of Management, Premvir Kapoor, Khanna Publishing House
- PRINCIPLES OF MARKETING; Kotlar Philip and Armstrong Gary, Pearson Education
- MARKETING MANAGEMENT; Ramaswamy, V.S. and S. Namakumari: Macmillian
- SALES MANAGEMENT; Condif, Still and Govani et.al: Prentice Hall of India
- SALES MANAGEMENT; Text; Cases & Readings: Vaccaro J.P: Prentice Hall of India
- ADVERTISING & SALES PROMOTION; Kazmi & Batra: Excel Books