Maulana Abul Kalam Azad University of Technology, West Bengal

(Formerly West Bengal University of Technology)

B.Voc. in Electronic Manufacturing Services (UGC)

(Effective for Academic Session 2024-2025)

Year - 2 Advanced Diploma (SEMESTER - III)

Paper Title: UEMSV – 301: MICROPROCESSOR

Job Role: Electronics Senior Technician

Course Objectives:

- To introduce the fundamentals of microcomputers, microprocessors, and assembly language programming.
- To develop understanding of the architecture and operation of 8085 and 8086 microprocessors, including instruction sets and programming techniques.
- To explain timing diagrams, memory and I/O interfacing concepts essential for microprocessor-based system design.
- To familiarize with advanced microprocessor features like stack, subroutines, interrupts, and peripheral interfacing including programmable controllers and DMA.

Course Outcomes:

CO 1: Describe microprocessor architecture and microcomputer systems including 8085 and 8086 pin configurations and basic operations.

CO 2: Write and execute assembly language programs using 8085 instructions covering data transfer, arithmetic, logical, and branching operations.

CO 3: Analyze timing diagrams and design memory and I/O interfacing for microprocessor systems.

CO 4: Implement subroutines, interrupts, and utilize programmable peripheral interfaces and controllers for efficient microprocessor system management.

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Course Code:	**UEMSV – 301**	
Course:	**MICROPROCESSOR**	**Credits: 3L+1T**
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	**Micro - computer, Micro - Processor and Assembly Language**: Digital Computer, Computer Languages, Single Chip Micro -Computer. **Microprocessor Architecture and Microcomputer system:** Microprocessor Architecture and its operations, Memory, Input/output, example of a microcomputer system. **8085 Based Microcomputer system:** The 8085 MPU, Example of an 8085 Based Microcomputer. Pin details of 8085 MPU. Pin diagram of 8086, 8088.	**13**
Unit-II	**Introduction of 8085, Basic instructions, Timings**: Instruction classification, Instruction formats. How to write and execute a simple program. Instruction Timings and Operation status. Data transfer instruction. Arithmetic operations, Branch operations. **Programming Techniques of 8085 MPU**: Assembly Language Programs; Looping, Arithmetic Operations related to memory, Logical operations; Rotate, Compare.	**17**
Unit-III	**Timing Diagram Technique**: Memory Read, Memory write, OPcode - Fetch with and without wait state, T - state calculation of different instruction. **Microprocessor interface**: Memory interface, I /O Port interface, programmable peripheral interface, Memory mapped I /O, I /O mapped I /O.	**15**
Unit-IV	**Stack, Subroutines and interrupts**: Sack, subroutine, Conditional call and return instruction, Advanced subroutine concept. The 8085 interrupt. **Introduction of Data Transfer Schemes**: The 8255 / 8155 programmable Peripheral interface: Introduction, Pin details, Concept of Control Reg, Interrupt driven I/O, DMA, Programmable interrupt Controller - 8259 and DMA Controller - 8237.	**15**
	Total:	**60**

Books Recommended:

- Microprocessor & Architecture Programming & Application, Ramesh Gaonkar
- Fundamentals of Microprocessor & Microcomputer Controller, B. Ram

Paper Title: UEMSV – 391 MICROPROCESSOR LAB

Credit: 2P (Allotted Hours: 60)

List of Experiments: (Based on UEMSV – 301)

- Introduction to the microprocessor trainer kit. Giving ideas to the students about putting, running a viewing the result ofa program in this trainer kit.
- ALP on addition by direct and indirect addressing method.
- ALP on addition by using loop in indirect addressing method.
- ALP on subtraction.
- ALP to find out the larger among two numbers.
- ALP to find out the largest among five numbers.
- ALP to find out smaller out of two numbers
- ALP to find out the smallest out of five numbers
- ALP to check a bit condition of a data byte.
- ALP to check all bits 1 condition of a number
- ALP to check all bits zero condition of a data byte.
- Programming of EPROM

Paper Title: UEMSV – 302: AUDIO & VIDEO ENGINEERING

Job Role: Electronics Senior Technician

Course Objectives:

- To provide foundational knowledge of acoustics, including sound properties and audio device characteristics such as microphones and loudspeakers.
- To explain digital recording principles, storage media, and fundamentals of stereo sound systems and public address (PA) systems.
- To introduce TV standards, broadcasting channels, and the technical aspects of TV receiver components.
- To explore satellite TV technology, cable systems, advanced digital TV technologies, and optical media such as CDs, DVDs, and Blu-ray discs.

Course Outcomes:

CO 1: Understand basic acoustics, characteristics, and operational principles of microphones, loudspeakers, and related audio devices.

CO 2: Describe digital recording techniques, storage media types, and components of stereo and public address sound systems.

CO 3: Explain TV broadcasting standards, signal transmission, and the functional subsystems of TV receivers.

CO 4: Analyze satellite TV systems, advanced digital TV technologies, and media formats including DVD, Blu-ray, and digital wireless audio transmission.

Course Code:	**UEMSV – 302**	
Course:	**AUDIO & VIDEO ENGINEERING**	**Credits:3L+1T**
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	**Acoustics**: Brief idea of sound, Amplitude, frequency and wave length. **Microphone and Loudspeaker:** Characteristics of Microphone and Loud speaker. Principle of operation of microphone and loud speaker. Brief idea of head phone, wireless microphone, woofer, squawker, sub - woofer and tweeter. Cross - over network, two - way and three - way network, bass - reflex system, battle and enclosure. **Digital Recording:** Principle of digital recording, different kinds of digital storage, ICs, card, HD etc. Storage on CD, VCD, DVD and blue ray disk.	**13**
Unit-II	**Stereo sound system:** Principle of recording and reproduction, Bass, Trebble, volume and balance control, Graphic Equalizer. Noise and Distortion, Dolby system, Hi - fi stereo, quadraphonic sound, 5. 1 channel sound system. **Public Address system:** Basic principle, requirements of PA system. Working of PA system with associated controls. **TV Standards and channel:** Concept of TV system, CCIR, PAL, NTSC and SECAM. TV broadcasting bands, channels and VSB.	**14**
Unit-III	**Transmission of CCVS**: Primary colours, Mixing of colours, meaning of R - Y, G - Y, B - Y, U, V etc. Transmission of CCVS. Colour burst signal, CCVS for 1 - scanning line. **TV Receiver sub - sections:** Tuner, IF sub - system, Deflection processor & synchronizing, Luminance processing, AGC and AFT, Deflection amplifiers,Monochrome picture tube, Colour picture tube, Chrome signal processing, Video output and R G - B amplifiers, Remote control & OSD, System control & memory, SMPS,	**17**
Unit-IV	**Satellite TV**: Off - set dish, Alignment of dish as per look angle, Global coverage of TV transmission, UP Link, Down link and foot print, Components of satellite, satellite bands - C band and KU band frequencies, DTH broadcasting system, broadcasting parameters. Components of SDU, Components of MDU, Cable TV system, CAS. **Advanced TV Technology:** Digital TV system, Projection TV & video projector, DVBH and DVBT, LCD TV Technology, LCD Display panel, Plasma display panel, LED TV, IPTV, Features of latest TV, CCTV and DVR. **CD/VCD/DVD:** Features of VCD & DVD, DVD Encoding process, DVD decoding process, DVD format, DVD types, DVD HT Digital wireless audio transmission, DVD input and out ports, servo, pick up unit. Blue ray disks	**16**
	Total:	**60**

Books Recommended:

- Monochrome and Colour TV, R. R. Gulati
- CTV Principle and Practice, R. R. Gulati
- Audio and Video System, R. G. Gupta
- Audio Video Systems, Bali & Bali, Khanna Publishing House (AICTE Recommended Textbook)

Paper Title: UEMSV – 392 AUDIO& VIDEO ENGINEERING LAB

Credit: 2P (Allotted Hours: 60)

List of Experiments: (Based on UEMSV – 302)

- Circuit explanation of stereo sound system.
- Experiments on stereo sound system.
- Circuit explanation of PA system.
- Demonstration on PA system.
- Demonstration on high fidelity audio system.
- CTV Receiver stage location as per block diagram.
- CTV Receiver components function.
- CTV(LED) Set assembling
- Demonstration on DVD Player.
- Demonstration on LCD TV/LED TV.
- Demonstration on Smart TV features.
- Replacement of LED TV mother board by universal TV kit.
- Installation of LED/OLED TV.
- Operation of remote control and explanation of features of LCD/LED TV and DVD Player.
- Fault detection of LED display monitor.
- Fault detection of Modern TV sets.

Paper Title: UEMSV – 303: FUNDAMENTAL OF TROUBLESHOOTING ELECTRONIC EQUIPMENT

Job Role: Electronics Senior Technician

Course Objectives:

- To understand the fundamental procedures involved in troubleshooting electronic equipment, including fault diagnosis and corrective actions.
- To familiarize with various tools, test equipment, and mechanical/electromechanical components used in servicing and maintenance.
- To learn the principles and practices of preventive maintenance and effective maintenance management.
- To acquire knowledge about installation procedures, environmental considerations, safety, and professional work habits in electronic maintenance.

Course Outcomes:

CO 1: Demonstrate the ability to systematically troubleshoot electronic devices using manuals, test instruments, and proper techniques.

CO 2: Identify and effectively use hand tools, soft tools, and electronic test equipment for servicing and maintenance tasks.

CO 3: Apply preventive maintenance techniques to electronic and mechanical systems and understand maintenance management strategies.

CO 4: Implement safe installation and maintenance procedures considering environmental factors and maintain proper documentation and professional work ethics.

Course Code:	**UEMSV – 303**	
Course:	**FUNDAMENTAL OF TROUBLESHOOTING ELECTRONIC EQUIPMENT** **Credits: 3L+1T**	
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	**Fundamental Troubleshooting Procedure**: Making of an electronic equipment: Electronic circuits, Inside of an electronic equipment, Types of PCB. Reading Drawings and diagrams: Block diagram, circuit diagram, wiring diagram. Equipment Failures: Causes of Equipment Failures: Poor design, Production Deficiencies, Careless Storage and Transport, Inappropriate conditions during working life. Nature of faults. Maintenance terminology. Getting Inside electronic equipment: Dis - assembly, Re - assembly. Troubleshooting Process: Fault location procedure. Fault Finding Aids: Service and maintenance Manuals and Instruction manuals, Test and measuring instruments, special tools. Troubleshooting techniques: Preliminary observation, troubleshooting methods, systematic troubleshooting checks. Approaching components for test Grounding systems for electronic equipment. Corrective action: Arranging replacement parts, Component replacement, performance check, replacement of circuit boards. Situations when repairs should not be attempted. General guidelines	**14**
Unit-II	**Tools, Aids, Test equipments for servicing and maintenance:** Hand Tools: Pliers, Cutters, Spanners, Screw Drivers, Nut Drivers, Drills, Files, Other Workshop Tools. Soft Tools: (Chemicals for Workbench): Solvents, Adhesives, Lubricants, Freeze Sprays. Test Equipments: Multimeters, Oscilloscope, Logic Analyser, Signal Generators, Power Supplies etc. Mechanical and Electromechanical Components: Fuses and Fuse Holders, Switches, Wires and Cables, Connectors, Circuit Boards, Electromagnetic Relays.	**16**
Unit-III	**Preventive Maintenance:** Indications of Preventive Maintenance Action, Preventive Maintenance of Electronic Circuit, Preventive Maintenance of Mechanical Systems, General guidelines for cleaning and lubricating. **Maintenance Management:** Objectives of Maintenance Management, Maintenance Policy, Equipment Service Options, Maintenance Organization. Essential of Good Equipment Management Program: Planning for New Equipment, Acquisition Process, Planning of Utilities, Inventory Control, User Training, Technical Training, Maintenance Arrangement, Preventive Maintenance, Quality Assurance.	**13**
Unit-IV	**Installation Procedures:** Environmental Considerations, Humidity, Altitude, Shock and Vibrations, Protection from EMI, Safety. Service and Maintenance Laboratory: Workbench, Power for the Workbench, Lighting, Storage. Documentation: Maintenance of System Overview, Sample of a Work Order for Repairs, Information Tags. Professional Qualities and Work Habits: General Skills, Work Habits, Personal Safety.	**17**
	Total:	**60**

Books Recommended:

- Troubleshooting Electronic Equipment, Dr R. S. Khandpur.

Paper Title: UEMSV – 393 FUNDAMENTAL OF TROUBLESHOOTING ELECTRONIC EQUIPMENT LAB

Credit: 4P

List of Experiments: (Based on UEMSV – 303)

- Different tools used in test and troubleshooting an electronic equipment/gadgets
- Including safety tools.
- Multimeter and it's uses.
- Function generator and it's uses.
- Pliers, cutters, spanners, screw drivers, nut drivers, drills, files, other workshop tools
- Reading of drawings and diagrams: Block diagram, circuit diagram, wiring diagram.
- Grounding systems for electronic equipment.
- Use of oscilloscope in the troubleshooting of PCB of an electronic equipment.
- Basic tips before getting inside electronic equipment.
- Basic procedure followed for the de assembly and assembly of electronic equipment.
- The procedure that should be followed for troubleshooting or locating the faults in electronic equipment.
- Troubleshooting techniques: Preliminary observation, troubleshooting methods, systematic troubleshooting checks.
- Arranging replacement parts, component replacement, performance check, replacement of circuit boards.
- Mechanical and Electromechanical Components: Fuses and Fuse Holders, Switches, Wires and Cables, Connectors,Circuit Boards, Electromagnetic Relays.
- Hands on about PCB layout of electronic equipment.

Paper Title: UGEN – 381: VALUE EDUCATION & HUMAN RIGHTS

Course Objectives

- To introduce the concept, importance, and need for value education and human values in personal and professional life.
- To understand the influence of global development, media, and cross-cultural dynamics on ethics and values.
- To explore therapeutic practices like yoga and meditation for emotional balance and mental well-being.
- To gain awareness of human rights, their evolution, classifications, and related constitutional provisions.

Course Outcomes

CO 1: Develop a clear understanding of human values and their role in personal development and character formation.

CO 2: Analyze the impact of globalization, media, and societal challenges on ethics, especially among adolescents.

CO 3: Apply therapeutic techniques such as meditation and yoga for emotional regulation and mental clarity.

CO 4: Demonstrate awareness of human rights, their enforcement mechanisms, and understand the rights of women and children in national and global contexts.

Course Code:	**UGEN – 381**	
Course:	**VALUE EDUCATION & HUMAN RIGHTS**	**Credits: 4P**
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	**Concept of Value Education** • Meaning, definition, objectives, and importance of value education. • Philosophical foundations of values – moral, ethical, spiritual, social, cultural, political, and economic values. • Role of values in personal and professional life. • Sources of values: family, society, religion, culture, and education. • Value crisis in the modern world – materialism, consumerism, and loss of human touch. • Role of education in value formation. • Case studies of value-based living (e.g., Mahatma Gandhi, Swami Vivekananda, Mother Teresa).	**15**
Unit-II	**Human Rights: Foundations & Evolution** • Definition, nature, and scope of human rights. • Historical development of human rights: Magna Carta, American Bill of Rights, French Revolution, UN Charter. • Universal Declaration of Human Rights (UDHR), 1948 – significance and key provisions. • International Covenants on Civil, Political, Economic, Social, and Cultural Rights. • Generations of Human Rights (Civil-Political, Economic-Social-Cultural, Collective-Solidarity Rights). • Role of UNESCO, UNHRC, and other international organizations.	**25**
Unit-III	**Indian Perspective on Human Rights** • Human rights in the Indian Constitution – Preamble, Fundamental Rights, and Directive Principles of State Policy. • Fundamental Duties and their significance. • Constitutional safeguards for minorities, women, SC/ST, and other vulnerable groups. • Role of National Human Rights Commission (NHRC), State Human Rights Commissions (SHRCs). • Human Rights and Social Justice in India – issues and challenges. • Landmark Supreme Court cases on human rights in India.	**25**
Unit-IV	**Values in Personal and Social Life** • Values in individual life: honesty, integrity, empathy, non-violence, tolerance, cooperation, and compassion. • Interpersonal values – respect, trust, forgiveness, gratitude. • Social values – equity, justice, freedom, secularism, pluralism, democracy. • Gender equity and dignity of labor. • Role of media and education in promoting social values. • Civic responsibility, environmental ethics, and sustainable development.	**15**
	Human Rights Issues & Challenges • Human rights violations – child labor, bonded labor, custodial violence, trafficking, discrimination, refugees. • Human rights of marginalized groups – women, children, elderly,	

Unit-V	differently-abled, tribals, LGBTQ+. • Global issues: poverty, illiteracy, terrorism, displacement, communal violence, migration. • Environmental rights – right to clean water, air, and sustainable environment. • Human rights in the era of globalization and technology (digital rights, privacy, AI ethics). • Case studies of human rights violations and movements.	**15**
Unit-VI	**Education for Values & Human Rights** • Role of teachers, educational institutions, and curriculum in value inculcation. • Pedagogical approaches for value education – storytelling, group discussion, role play, debates, moral dilemmas. • Human rights education – objectives, strategies, and methodologies. • Value-based leadership and good governance. • Role of NGOs, civil society, and social movements in human rights protection. • Building a culture of peace and non-violence through education. • Project work, field visits, and community engagement.	**25**
	Total	**120**

Books Recommended:

- Value education and human rights, By R. P. Shukla, Sarup & Sons
- Professional Ethics and Human Values, Premvir Kapoor, Khanna Publishing House (AICTE Recommended Textbook)
- Value Education And Education For Human Rights, By V.C. Pandey, Gyan Publishing House.
- Education for Values, Environment and Human Rights, By Y. K. Sharma, Published by Deep and Deep Publications.
- Human Rights: Twenty First Century Challenges, edited by V.N. Viswanathan (ed. By), Gyan Publishing House.
- Education for Values, Environment and Human Rights, By J. C. Aggarwal, Shipra Publications, 2005
- Human Rights Education: A Global Perspective, edited by Hemlata Talesra, Nalini Pancholy, Mangi Lal Nagda,Published by Daya Books.

Paper Title: UGEN – 382: BASIC ACCOUNTING

Course Objectives

- To introduce the fundamental accounting process and familiarize students with key accounting concepts and principles.
- To provide hands-on experience in recording business transactions using journals, ledgers, and accounting equations.
- To equip students with the skills to prepare and analyze key financial statements and worksheets.
- To develop practical knowledge of payroll accounting, merchandising transactions, and reconciliation techniques.

Course Outcomes

CO 1: Understand and apply the accounting cycle, including journalizing transactions and using T-accounts to analyze changes in financial position.

CO 2: Prepare and post entries to ledgers, reconcile bank statements, and correct accounting errors using standard methods.

CO 3: Record and process merchandising transactions, utilize subsidiary ledgers, and perform end-of-period adjustments and closing entries.

CO 4: Accurately calculate payroll, complete payroll records, and prepare comprehensive financial statements including classified balance sheets and income statements for merchandising businesses.

Course Code:	**UGEN – 382**	
Course:	**BASIC ACCOUNTING**	**Credits: 4P**
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	**Introduction to Accounting** • Meaning, objectives, and importance of accounting. • Users of accounting information – internal & external. • Bookkeeping vs. Accounting. • Basic accounting terms: assets, liabilities, capital, revenue, expenses, drawings, profit, loss, stock, etc. • Accounting principles: concepts (business entity, going concern, money measurement, accrual, conservatism, dual aspect, matching). • Accounting standards – overview.	**20**
Unit-II	**Double Entry System & Accounting Process** • Double entry principle and accounting equation. • Journal – meaning, features, format, rules of debit and credit. • Ledger – posting from journal to ledger, balancing of accounts. • Subsidiary books – cash book, purchase book, sales book, purchase return, sales return, petty cash book. • Trial Balance – objectives, preparation, errors and their rectification.	**25**
Unit-III	**Bank Transactions & Reconciliation** • Cash Book vs. Pass Book. • Causes of differences between Cash Book and Pass Book. • Bank Reconciliation Statement (BRS) – meaning, importance, preparation. • Adjusted Cash Book method.	**15**
Unit-IV	**Final Accounts of Sole Proprietors** • Meaning and preparation of Trading Account. • Profit & Loss Account – preparation and adjustments (outstanding expenses, prepaid expenses, accrued income, depreciation, bad debts, provisions). • Balance Sheet – preparation and classification of assets & liabilities. • Adjustment entries and their effect on final accounts.	**20**
Unit-V	**Depreciation, Reserves & Provisions** • Meaning, causes, and need for depreciation. • Methods of depreciation – straight line, written down value, annuity, depletion. • Accounting treatment of depreciation. • Provisions and reserves – differences and importance.	**25**
Unit-VI	**Introduction to Partnership & Company Accounts** • Partnership Accounts – features, partnership deed, capital accounts, interest on capital/drawings, profit-sharing ratio. • Admission of a partner – goodwill, revaluation of assets and liabilities. • Retirement & death of a partner – adjustments. • Introduction to Company Accounts – shares, debentures, issue and forfeiture of shares (basic concepts).	**15**
	Total:	**120**

Books Recommended:

- Basic Accounting: The step-by-step course in elementary accountancy, By Nishat Azmat, Andy Lymer, Hachette UK.
- Basic Accounting, By Rajni Sofat, PHI Learning Pvt. Ltd.
- BASIC ACCOUNTING, By SOFAT, RAJNI , HIRO, PREETI, PHI Learning Pvt. Ltd.
- Accounting for Beginners, By Kokab Rahman, Createspace Independent Pub, 2013

Paper Title: UEMSV – 401: PC SOFTWARE

Job Role: Electronics Senior Technician

Course Objectives

- To introduce the fundamentals of Disk Operating System (DOS) and Windows Graphical User Interface (GUI).
- To develop practical skills in using word processing, spreadsheet, and presentation software.
- To enable students to create and manage documents, perform data analysis, and deliver presentations.
- To provide foundational knowledge of internet technologies, services, and applications.

Course Outcomes

CO 1: Operate DOS effectively using internal and external commands, manage files and directories, and create basic batch files.

CO 2: Create, format, and manage professional documents using word processing software with advanced features like tables, headers, footers, and mail merge.

CO 3: Use spreadsheet software for data entry, calculations, formatting, charting, and basic database management, including macros and multiple worksheets.

CO 4: Design and deliver visually engaging presentations with multimedia elements and animations, and understand internet fundamentals and web-based applications.

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Course Code:	**UEMSV – 401**	
Course:	**PC SOFTWARE**	**Credits: 3L+1T**
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	DOS : Versions of DOS: Booting sequence; Warm and Cold reboot; Concept of File and directory , Redirecting command input and output pipes, Wildcard characters, Types of DOS commands: Internal and External; Internal Commands: DIR, MD, CD , CLS, COPY, DATE, DEL, PATH, PROMPT, REN, RD, TIME, TYPE, VER, VOL; External Commands: XCOPY, ATTRIB, BACKUP, RESTORE, FIND, SYS , FORMAT, CHKDSK, DISKCOPY, LABEL, MOVE, TREE, DELTREE, DEFRAG, SCA NDISK, UNDELETE. Batch Files: Introduction to simple batch files; Introduction to CONFIG. SYS and AUTOEXEC. BAT files. Graphical User Interface: Fundamentals of windows, types of windows, anatomy of windows, Icons, Recycle bin Operations on window: Opening a Window, Minimizing and Maximizing a window, Moving window, Resizing Window, Closing the window windows explorer Folders: Creating and deleting folders, copying, renaming folders, folder properties. Control panel.	**16**
Unit-II	Word Processing Package: Basics of Word Processing; Opening and Closing of documents; Text creation and Manipulation; Finding and replacing text, Printing of document, Formatting of text; Margin setting, Adding Borders and shading, Adding Headers and Footers, Setting up Multiple columns, Working with tables, Spell check, Grammar facility, Auto text, language setting and thesaurus; Mail merging. Installation of Word Processing Software.	**14**
Unit-III	Spreadsheet Package : Worksheet Basics, Data Entry in Cells : Entry of numbers, text and formulae, Moving data in a worksheet, Moving around in a worksheet, Selecting Data Range, Using the Interface (Toolbars, Menus), Editing Basics, Working with workbooks, Cell referencing; Formatting and Calculations: using Auto fill, Working with Formulae, Efficient Data Display with Data formatting (number formatting, date formatting etc.), Working with Ranges, Worksheet Printing; Working with Graphs and Charts : Creating Embedded Chart using char wizard, sizing and moving parts, updating charts, Changing chart types, Chart wizard, Adding Titles, Legends and Gridlines, Printing Charts; Database Management. Finding records with Data form, Adding/Deleting Records, Filtering Records in a worksheet; Functions and Macros: Worksheet Creating Macros, Recording Macros, Running Macros, Assigning Macros to Buttons, Defining Macros from Scratch. Multiple Worksheets. Installation of Spreadsheet software.	**17**
Unit-IV	Presentation Packages: Basics, General Features, Creating a presentation, formatting and enhancing text, Incorporation of Animation, adding charts, multimedia, page setup and printing slides. Installation of Presentation software. Internet and WWW: Evolution of Internet, services provided on Internet, Access Methods, application of Internet.	**13**
	Total:	**60**

Books Recommended:

- Ravichandran, 2014, Computers Today, Khanna Publishing House
- Mathur Rajiv, 1996: Learning Word 6 for Windows Step - by - Step, Galgotia.
- Mathur Rajiv, 1996: Learning Excel 5 for Windows Step - by - Step, Galgotia.
- Jamsa, Kris A. , 1993: Rescued by Windows 3. 1, Galgotia. 5. Basandra, S. K. , 1995
- Computers Today, Galgotia.
- Kasser, Barbara, 1998: Using the Internet, PHI, 4th ed. , New Delhi.
- Wall, David A. & Others, 1996: Using the World Wide Web, PHI, 2nd ed. , New Delhi.
- Ramesh Bangia, 2017, PC Software Made Easy, Khanna Publishing House
- Mastering Excel, Khanna Publishing House

Paper Title: UEMSV – 491 PC SOFTWARE LAB

Credit: 2P (Allotted Hours: 60)

List of Experiments: (Based on UEMSV – 401)

- Create directory and files in DOS
- Execute DOS internal commands – DIR, MD, CD, CLS, COPY, DATE, DEL, REN , RD, TYPE
- Execute DOS external command – XCOPY, ATTRIB, FIND, CHKDSK, TREE
- Create folder in Windows Desktop
- Create files within folder using Notepad.
- Create Word document (.docx file)
- Perform formatting task within the word document.
- Apply Header and footer in a multiple page document.
- Create tables and apply different options within table, format table.
- Apply Mail Merge in Word.
- Create Excel worksheet with proper data.
- Apply functions – sum(), average(), count(), max(), min(), countblank(), right(), left(), concatenate(), sumif() in excel.
- Create different charts (bar, column, line, pie) in excel.
- Apply Filters (Auto / Advance) in excel.
- Apply data sorting in excel.
- Create PowerPoint presentation file with multiple slides.
- Apply slide transitions.
- Apply animation to slide objects
- Add chart within slides.
- Practice internet browsing.

Paper Title: UEMSV – 402: MOBILE & SMART PHONE

Job Role: Electronics Senior Technician

Course Objectives

- To provide foundational knowledge in mobile communication and internal mobile phone hardware.
- To train students in the use of various mobile phone repair tools and diagnostic equipment.
- To develop skills in hardware and software troubleshooting techniques, including soldering, IC rework, and flashing.
- To equip students with practical knowledge for identifying and resolving common mobile phone faults, including water damage and software corruption.

Course Outcomes

CO 1: Identify mobile phone components and perform assembly/disassembly using appropriate tools and safety procedures.

CO 2: Analyze and repair mobile phone hardware issues using PCB diagnostics, IC testing, and soldering/rework techniques.

CO 3: Diagnose and resolve software issues through flashing, unlocking, and virus removal using various repair software and flasher boxes.

CO 4: Troubleshoot and repair advanced mobile phone faults using schematic diagrams, jumper techniques, and internet-based resources.

Course Code:	**UEMSV – 402**	
Course:	**MOBILE & SMART PHONE**	**Credits: 3L+1T**
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	**Basics and Basic Electronics:** Basics of mobile communication. Assembling and disassembling of various models of mobile phones. Study of various tools and equipment used in mobile phone repairs. Study of parts inside a mobile phone. Using a multimeter. Use of DC Power Supply (Jhatka machine).	**13**
Unit-II	**Hardware Repair:** Introduction and study of Printed Circuit Board (Motherboard). Details of various components on the PCB. Testing of various parts and components. Study of different ICs (chips) used on the motherboard. How to recognize various ICs. Soldering & desoldering of components by using a soldering iron. Soldering & desoldering of components by using a rework station. Reheating and mounting of various BGA and SMD chips. Ultrasonic cleaning procedure.	**14**
Unit-III	**Software Repair:** Detailed study of various faults arising due to corrupt software. Introduction of various flasher boxes and software. Flashing of various brands of handsets. Removing virus from infected phones. Unlocking of handsets through codes and/or software. Use of various secret codes	**17**
Unit-IV	**Basic and Advanced Troubleshooting:** Fault finding, troubleshooting and repairing of various faults. Common repair procedure for hardware related faults. Common repair procedure for software related faults. Water damaged repair techniques. Circuit tracing, jumper techniques and solutions. Troubleshooting through schematic diagrams. Use of internet for troubleshooting faults. Advanced troubleshooting techniques.	**16**
	Total:	**60**

Books Recommended:

- Mobile Phones and Tablets Repairs: A Complete Guide for Beginners and Professionals, Chukky Oparandu
- ANDROID & WINDOWS MOBILE PHONE REPAIRING, SANJIB. PANDIT
- William L. Armstrong, Learn Cell Phone Repair, kindle edition, 2013
- Pandit Sanjib, Advance Mobile Repairing: Multicolour Circuits, Service Diagrams & Repairing, BPB publications. 2010.
- Mobile repairing Books, Manohar Lotia, BPB Publication, New Delhi , latest edition
- Swati Saxena, A Glance over Android with Kotlin, Khanna Publishing House

Paper Title: UEMSV – 492 MOBILE & SMART PHONE LAB

Credit: 2P (Allotted Hours: 60)

List of Experiments: (Based on UEMSV – 402)

- Demonstration of various Tools and Equipment used in Mobile Phone repairing
- Identification of stages of different mobile Phone as per block diagram.
- Demonstration on Battery booster for smart phone repairing.
- Demonstration on DC power supply for smart phone repairing.
- Demonstration on SMD Rework Station for smart phone repairing.
- Demonstration on BGA plate set.
- Demonstration on PDA separator.
- Explanation of Identification process of different IC's i.e
- Network IC,R F IC, Power IC, CPU, Flash, display etc on PCB.
- Testing process of different components like Microphone, Ear peace,
- Ringer, headphone etc &Track line analysis of the same.
- De assembles and Assemble of branded Hi-end handsets.
- Unlocking of handsets.
- Re balling of IC. with BGA Plate set & rework station.
- Replacing of Battery connectors, LCD ,Head ph socket etc by SMD Rework stn& soldering Iron.
- Driver installation.
- Software flashing.
- Troubleshooting of S/W and H/W problems.

Paper Title: UEMSV – 403: TROUBLESHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENT - I

Job Role: Electronics Senior Technician

Course Objectives

- To provide students with hands-on knowledge of the installation, operation, and troubleshooting of commonly used home appliances.
- To familiarize learners with internal components and working principles of appliances like washing machines, microwave ovens, steam irons, rice cookers, kettles, mixers, grinders, and induction cookers.
- To develop diagnostic and repair skills for identifying and rectifying electrical, electronic, and mechanical faults in home appliances.
- To ensure understanding of safety protocols and procedures during maintenance work on domestic appliances.

Course Outcomes

CO 1: Install, operate, and repair semi-automatic and fully automatic washing machines, identifying faults in motors, valves, and control panels.

CO 2: Troubleshoot and repair microwave ovens, including diagnosis of touch panel faults, HV components, and fuse failures, while ensuring safety through interlock mechanisms.

CO 3: Disassemble, trace circuits, and rectify faults in steam irons, electric rice cookers, and electric kettles.

CO 4: Service and repair mixers, grinders, and induction cookers by identifying their components, understanding their operating principles, and correcting functional defects.

Course Code:	**UEMSV – 403**	
Course:	**TROUBLESHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENT - I** **Credits: 3L+1T**	
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	**Washing machine**: Installation of front load washing machine, Installation of top load washing machine, Identify the internal and external parts of semi - auto washing machine, Identify the internal and external parts of fully automatic washing machine, Operate semi-automatic washing machine, Operate fully-automatic washing machine, Rectify the fault leading to not working of control panel switches. Rectify the fault leading to not working of pulsator / agitator. Rectify the fault leading to spin drier not working. Rectify the fault leading to one side rotation of motor. Rectify the fault leading to water inlet and outlet valves.	**15**
Unit-II	**Microwave oven**: Identify the internal and external parts of micro wave oven. Identify the different touch pad controls their functions, Testing of high voltage diode. Identify the HV capacitor and discharge it. Rectify the fault leading to fuse blows off when cooking is initiated. Rectify the fault leading to not responding of touch switches. (front panel). Rectify the fault leading to dead set. Rectify the fault leading to long cooking time. Precautions - importance of interlocking switch in performing maintenance	**14**
Unit-III	**Steam Iron:** Dismantle and identification of various parts, wiring, tracing of various controls, Electronic circuits in steam Iron, Identify the faults in steam iron & rectify **Electric Rice cooker:** Identify various components of Electric rice cooker, controls and trace the circuit and rectify the simulated faults. **Electric kettle:** Identify various components of Electric kettle, controls and trace the circuit and rectify the simulated faults.	**16**
Unit-IV	**Mixer & Grinder:** Dismantle and identification of various parts, wiring, tracing of various controls, Electronic circuits in various types of Mixers/grinders, Identify the faults in various types of Mixers/grinders & rectify. **Induction cooker:** Principle of Induction heating, Construction, Working and troubleshooting.	**15**
	Total:	**60**

Books Recommended:

- Eric Kleinert, Troubleshooting and Repairing major appliances, McGrawHill, McGraw Hill Professional, third edition, 2012.
- Modern Washing Machine Servicing, Manahar Lotia

Paper Title: UEMSV – 493 TROUBLESHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENT LAB – I

Credit: 2P (Allotted Hours: 60)

List of Experiments: (Based on UEMSV - 403)

- Mixer grinder- a)Major parts, their functions and checking, b) Features of different Mixer Grinder, Their mantling and
- dismantling, technical specifications and maintenance.
- Electric Rice cooker: Identification of components, their function and checking their mantling and dismantling, technical specifications and maintenance.
- Steam iron: Identification of components, their function and checking, their mantling and dismantling, technical specifications and maintenance..
- Electric kettle:. Identification of components, their function and checking, their mantling and dismantling, technical specifications and maintenance.
- Induction cooker: a) Identification of components, their function and checking, their mantling and dismantling, technical specifications and maintenance b) Utensils used, Features, Safety devices, calculation of power consumption. Circuit explanation.
- Microwave oven: a) Identification of components, their function and checking, their mantling and dismantling, technical specifications and maintenance b) Utensils used in microwave oven, Important tips for microwave cooking c) Feature Explanation of grill and convection MWO function, comparison between different models d) Circuit explanation
- Washing machine: a)Identification of components, their function and checking, their mantling and dismantling and technical specifications of front loading(semi automatic and fully automatic washing machine) b) Demo on drive mechanism c) Explanation of circuit diagram d) Installation and maintenance.

Paper Title: UGEN – 481: ENVIRONMENTAL STUDIES

Course Objectives

- To create awareness among students about the multidisciplinary nature and importance of environmental studies.
- To impart knowledge about the conservation of natural resources and promote sustainable lifestyles.
- To introduce the concepts of ecosystems, biodiversity, environmental pollution, and disaster management.
- To educate students about environmental legislation, ethics, and the role of individuals and society in environmental protection.
- To emphasize the significance of population control, public health, human rights, and the role of IT in environmental management.

Course Outcomes

CO 1: Understand the scope, importance, and interdisciplinary nature of environmental studies and the need for public awareness in environmental protection.

CO 2: Explain the structure and function of ecosystems and the importance of biodiversity, along with its conservation methods.

CO 3: Analyze various types of pollution, their causes, effects, and control measures, and understand the role of individuals in pollution prevention.

CO 4: Demonstrate awareness of major environmental issues like global warming, ozone depletion, and climate change, and assess related legislative and ethical dimensions.

CO 5: Apply knowledge of environmental laws, public awareness strategies, and health-related concerns to propose sustainable solutions and contribute responsibly to society.

Course Code:	**UGEN – 481**	
Course:	**ENVIRONMENTAL STUDIES**	**Credits: 4P**
Contents		
Chapter	**Name of the Topic**	**Hours**

Unit-I	**Introduction to Environment & Natural Resources**
	• Definition, scope, importance of Environmental Studies.
	• Components of environment – lithosphere, hydrosphere, atmosphere, biosphere.
	• Renewable & Non-renewable resources:
	  o Forest resources – uses, deforestation, afforestation, forest conservation.
	  o Water resources – uses, overexploitation, floods, droughts, conflicts over water, dams & their impacts.
	  o Mineral resources – exploitation, environmental effects of mining.
	  o Energy resources – renewable (solar, wind, hydro, biomass, geothermal) & non-renewable (coal, petroleum, natural gas, nuclear).
	  o Food resources – world food problems, sustainable agriculture.
	• Role of an individual in conservation of natural resources.
		20

Unit-II	**Ecosystems**
	• Concept, structure & function of an ecosystem.
	• Energy flow in an ecosystem – food chains, food webs, ecological pyramids.
	• Types of ecosystems:
	  o Forest ecosystem
	  o Grassland ecosystem
	  o Desert ecosystem
	  o Aquatic ecosystem (ponds, rivers, oceans, wetlands).
	• Biodiversity and its conservation:
	  o Levels of biodiversity – genetic, species, ecosystem.
	  o Value of biodiversity – consumptive, productive, social, ethical, aesthetic.
	  o Threats to biodiversity – habitat loss, poaching, pollution, invasive species.
	  o Conservation methods – in-situ & ex-situ.
		25

Unit-III	**Environmental Pollution**
	• Definition, causes, effects, and control measures of:
	  o Air pollution
	  o Water pollution
	  o Soil pollution
	  o Marine pollution
	  o Noise pollution
	  o Thermal pollution
	  o Nuclear hazards
	• Solid waste management – causes, impacts, control measures.
	• Role of individuals and communities in pollution prevention.
		15

Unit-IV	**Social Issues and Environment** • Sustainable development – concept and strategies. • Urban problems related to energy and environment. • Climate change, global warming, acid rain, ozone layer depletion. • Environmental ethics – issues and possible solutions. • Environmental impact of resettlement and rehabilitation projects. • Consumerism and waste products. • Environmental movements in India – Chipko, Silent Valley, Narmada Bachao Andolan. • Disaster management – floods, earthquakes, cyclones, landslides.	**25**
Unit-V	**Environmental Policies, Acts & Human Rights** • Environment Protection Act, 1986. • Air (Prevention and Control of Pollution) Act, 1981. • Water (Prevention and Control of Pollution) Act, 1974. • Wildlife Protection Act, 1972. • Forest Conservation Act, 1980. • Issues involved in enforcement of environmental legislation. • Role of judiciary, public awareness, NGOs, and media. • Environmental rights as human rights.	**15**
Unit-VI	**Human Population and Environment** • Population growth, population explosion, and impact on environment. • Human health & environment – communicable and lifestyle diseases. • Family welfare programmes – role in controlling population. • Environment & human rights – equity and social justice. • Role of information technology in environment and human health (GIS, remote sensing, environmental monitoring). • Case studies: population & resource consumption, health epidemics, sustainable urban development.	**20**
	Total:	**120**

Books Recommended:

- M.P. Poonia & S.C. Sharma, Environmental Studies, Khanna Publishing House
- Mike Hulme, Climates and Cultures.
- Mark Garrett, Encyclopaedia of Transportation Social Science and Policy.
- Steel, Science An A - to - Z Guide to Issues and Controversies.
- John A Matthews, Encyclopaedia of Environmental Change.
- O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House

Paper Title: UGEN – 482: QUALITY MANAGEMENT

Course Objectives

- To introduce the fundamentals and evolution of quality management and familiarize students with leading quality philosophies by Deming, Juran, and Crosby.
- To provide knowledge of graphical and statistical tools used for analyzing and improving process quality.
- To equip students with concepts of hypothesis testing, regression, control charts, DOE, TQM, Six Sigma, and other key methodologies for quality assurance and improvement.
- To develop an understanding of advanced quality improvement techniques including Quality Function Deployment (QFD), Taguchi Methods, and reliability analysis in product development.

Course Outcomes

CO 1: Understand and compare key quality management philosophies and explain the dimensions and costs associated with product and service quality.

CO 2: Apply graphical and statistical tools such as control charts and the 7 QC tools to analyze and improve process quality.

CO 3: Perform hypothesis testing, regression, ANOVA, and DOE to assess and optimize processes and evaluate process capabilities.

CO 4: Utilize advanced tools like QFD, Taguchi Methods, and Six Sigma strategies to enhance product design, reliability, and service quality.

Course Code:	**UGEN – 482**	
Course:	**QUALITY MANAGEMENT**	**Credits: 4P**
Contents		
Chapter	**Name of the Topic**	**Hours**
Unit-I	**Introduction to Quality Concepts** • Definition of Quality – product-based, user-based, manufacturing-based, and value-based perspectives. • Evolution of Quality – from inspection to Quality Control, Quality Assurance, and Total Quality Management (TQM). • Importance of quality in business competitiveness. • Dimensions of product and service quality. • Quality gurus and their contributions – Deming, Juran, Crosby, Ishikawa, Taguchi, Feigenbaum. • Cost of quality – prevention, appraisal, internal and external failure costs.	**25**
Unit-II	**Quality Planning & Quality Standards** • Quality planning process – customer focus, requirement analysis, benchmarking. • Quality function deployment (QFD) – House of Quality. • ISO standards – ISO 9000 family, ISO 14000, ISO 22000, ISO 27000. • Six Sigma – principles, DMAIC methodology, belt levels (Green, Black, Master Black Belt). • Role of quality certification and auditing. • National and International Quality Awards – Deming Prize, Malcolm Baldrige National Quality Award, Rajiv Gandhi National Quality Award.	**15**

Unit-III	**Statistical Quality Control**
	• Role of statistics in quality management.
	• Process variation – common causes vs. special causes.
	• Control charts –
	  o Variables (X-bar & R charts, X-bar & S charts).
	  o Attributes (p-chart, np-chart, c-chart, u-chart).
	• Acceptance sampling – single, double, and multiple sampling plans.
	• Operating Characteristic (OC) curves.
	• Process capability analysis (Cp, Cpk, Cpm).
		25

Unit-IV	**Total Quality Management** • Principles of TQM – customer focus, continuous improvement, employee involvement. • Kaizen, 5S, and Poka-Yoke. • Benchmarking – process, types, and benefits. • Business Process Reengineering (BPR) and its relationship with TQM. • Quality Circles – structure, role, and benefits. • Role of leadership in quality improvement.	**15**
Unit-V	**Tools & Techniques for Quality Improvement** • Basic quality tools – cause & effect diagram, check sheet, control chart, histogram, Pareto chart, scatter diagram, flow chart. • Advanced tools – affinity diagram, tree diagram, matrix diagram, arrow diagram, PDPC. • Failure Mode and Effect Analysis (FMEA). • Root Cause Analysis (RCA).	**20**

	• Just-In-Time (JIT) and Lean Manufacturing. • Taguchi method for robust design.	
Unit-VI	**Quality in Services & Future Trends (20 Hours)** • Service quality vs. manufacturing quality. • SERVQUAL model – dimensions of service quality (tangibles, reliability, responsiveness, assurance, empathy). • Customer relationship management (CRM) & customer satisfaction measurement. • Quality in education, healthcare, and IT services. • Role of technology in quality – Industry 4.0, Artificial Intelligence, and IoT in quality management. • Future trends – sustainable quality management, green quality, and ethical quality practices.	**20**
	Total:	**120**

Books Recommended:

- D. C. Montgomery, Introduction to Statistical Quality Control, John Wiley & Sons, 3rd Edition.
- M.P. Poonia & S.C. Sharma, Total Quality Management, Khanna Publishing House (AICTE Recommended Textbook)
- Mitra A. , Fundamentals of Quality Control and Improvement, PHI, 2nd Ed. , 1998.
- J Evans and W Linsay, The Management and Control of Quality, 6'th Edition, Thomson, 2005
- Besterfield, D H et al. , Total Quality Management, 3rd Edition, Pearson Education, 2008.
- D. C. Montgomery, Design and Analysis of Experiments, John Wiley & Sons, 6th Edition, 2004
- D. C. Montgomery and G C Runger, Applied Statistics and Probability for Engineers, John Wiley & Sons, 4th Edition.