KALINGA UNIVERSITY

RAIPUR | INDIA

SCHEME & SYLLABUS FOR

Bachelor of Vocational Studies (B. Voc.) Electronics Manufacturing Service

NAAC GRADE B+ Accredited University

nirf RANKING 2024 Ranked in Top 151-200 Universities

Kalinga University, Naya Raipur, Chhattisgarh

KALINGA UNIVERSITY
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ELECTRONIC MANUFACTURING SERVICE

Semester I							
Subject Code	**Subject**	**L**	**T/P**	**Credits**	**Internal Marks**	**External Marks**	**Total**
BVEMS101	Communication Skills	3	0	3	30	70	100
BVEMS102	Fundamentals of Information Technology	3	0	3	30	70	100
BVEMS103	Identification of Components, Connectors, Cables and Applications	3	0	3	30	70	100
BVEMS104	Basic Instrumentation	3	0	3	30	70	100
BVEMS105P	**Industrial Training/ On Job Training/ Workshop**	0	36	18	50	150	200
Total		**12**	**36**	**30**	**170**	**430**	**600**

Semester II							
Subject Code	**Subject**	**L**	**T/P**	**Credits**	**Internal Marks**	**External Marks**	**Total**
BVEMS201	Fundamental of Electrical	3	0	3	30	70	100
BVEMS202	Environmental Studies	3	0	3	30	70	100
BVEMS203	Soldering & De-Soldering of Components	3	0	3	30	70	100
BVEMS204	Principle of Electronics	3	0	3	30	70	100
BVEMS205P	**Industrial Training/ On Job Training/ Workshop**	0	36	18	50	150	200
Total		**12**	**36**	**30**	**170**	**430**	**600**

Semester III							
Subject Code	**Subject**	**L**	**T/P**	**Credits**	**Internal Marks**	**External Marks**	**Total**
BVEMS301	Tools, Equipment & Safety Measures	3	0	3	30	70	100
BVEMS302	Electronics Devices and Circuit	3	0	3	30	70	100
BVEMS303	Fundamental of Troubleshooting Electronic Equipment	3	0	3	30	70	100
BVEMS304	Mobile & Smartphone	3	0	3	30	70	100
BVEMS305P	**Industrial Training/ On Job Training/ Workshop**	0	36	18	50	150	200
Total		**12**	**36**	**30**	**170**	**430**	**600**

Semester IV							
Subject Code	**Subject**	**L**	**T/P**	**Credits**	**Internal Marks**	**External Marks**	**Total**
BVEMS401	Digital Electronics	3	0	3	30	70	100
BVEMS402	Fault Analysis & Repair	3	0	3	30	70	100
BVEMS403	Troubleshooting & Maintenance of Electronic Equipment	3	0	3	30	70	100
BVEMS404	Microprocessor	3	0	3	30	70	100
BVEMS405P	**Industrial Training/ On Job Training/ Workshop**	0	36	18	50	150	200
Total		**12**	**36**	**30**	**170**	**430**	**600**

Semester V							
Subject Code	**Subject**	**L**	**T/P**	**Credits**	**Internal Marks**	**External Marks**	**Total**
BVEMS501	Entrepreneurship Development Programme	3	0	3	30	70	100
BVEMS502	Manufacturing & Quality Norms	3	0	3	30	70	100
BVEMS503	Electronics System Packaging and Manufacturing	3	0	3	30	70	100
BVEMS504	Solar and LED Technician	3	0	3	30	70	100
BVEMS505P	**Industrial Training/ On Job Training/ Workshop**	0	36	18	50	150	200
Total		**12**	**36**	**30**	**170**	**430**	**600**

Semester VI							
Subject Code	**Subject**	**L**	**T/P**	**Credits**	**Internal Marks**	**External Marks**	**Total**
BVEMS601	Research Methodology	3	0	3	30	70	100
BVEMS602	Good Manufacturing Concept & Practices	3	0	3	30	70	100
BVEMS603	UPS and Inverter Technician	3	0	3	30	70	100
BVEMS604	PC Software	3	0	3	30	70	100
BVEMS605P	**Industrial Training/ On Job Training/ Workshop**	0	36	18	50	150	200
Total		**12**	**36**	**30**	**170**	**430**	**600**

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SEMESTER - I

COMMUNICATION SKILLS

BVEMS101

Course Objective

The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions. One of the critical links among human beings and an important thread that binds society together is the ability to share thoughts, emotions and ideas through various means of communication: both verbal and non-verbal. In the context of rapid globalization and increasing recognition of social and cultural pluralities, the significance of clear and effective communication has substantially enhanced.

Course outcome:

1. The purpose of this course is to introduce students to the theory, fundamentals and tools of communication
2. To develop vital communication skills which should be integral to personal, social and professional interactions.
3. One of the critical links between human beings.
4. An important thread that binds society together is the ability to share thoughts, emotions and ideas through various means of communication: both verbal and non-verbal.
5. In the context of rapid globalization and increasing recognition of social and cultural pluralities, the significance of clear and effective communication has substantially enhanced.

CONTENTS

Unit I: Introduction: **06**

Theory of Communication, Types and modes of Communication, Mediums and channels of communication, barriers to communication, English as a Global language, the Lingua Franca, Social influences on English

Unit II: Language of Communication: **06**

Verbal and Non-verbal (Spoken and Written) Personal, Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication, Varieties of English, Language, Accent, Dialect, Colloquialism, Historical influences on English

Unit III: Speaking Skills: **06**

Monologue Dialogue Group Discussion Effective Communication/ Mis- Communication Interview Public Speech, Regional influences on English, Convergence and divergence, Linguistic Imperialism,

Unit IV: Reading and Understanding- **06**

Close Reading, Reading analysis of a text - Audience and purpose, Content and theme, Tone and Mood, stylistic devices, structure Comprehension- Analysis and Interpretation Translation(from Indian language to English and vice-versa) Literary/Knowledge Texts

Unit V: Writing Skills **06**

Documenting Report Writing Making notes Letter writing, Writing tabloids, diary entry, open letters, essays, newsletter and magazine articles, skits, short stories, impersonating characters

It will enhance Language of communication, various speaking skills such as personal communication, social interactions and communication in professional situations such as interviews, group discussions and office environments, important reading skills as well as writing skills such as report writing, note taking etc. While, to an extent, the art of communication is natural to all living beings, in today's world of complexities, it has also acquired some elements of science. It is hoped that after studying this course, students will find a difference in their personal and professional interactions.

REFERENCE BOOKS:

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr. Ranjana Kaul, Dr. Brati Biswas

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FUNDAMENTALS OF INFORMATION TECHNOLOGY

BVEMS102

Unit I: Computer characteristics **06**

Speed, storage, accuracy, diligence; Digital signals, Binary System, ASCII; Historic Evolution of Computers; Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers; Personal computers: Desktop, Laptops, Palmtop, Tablet; Hardware & Software; Von Neumann model.

Unit II: Hardware **06**

CPU, Memory, Input devices, output devices. Memory units: RAM (SDRAM, DDR RAM, RDRAM etc. feature wise comparison only); ROM-different types: Flash memory; Auxiliary storage: Magnetic devices, Optical Devices; Floppy, Hard disk, Memory stick, CD, DVD, CD/DVD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digital camera, Touch screen Voice Input, Joystick, Optical readers, bar code reader; Output devices: Display device, size and resolution; CRT, LCD, LED; Printers: Dot-matrix, Inkjet, Laser; Plotters, Sound cards & speaker.

Unit-III: Software **06**

System software, Application software; concepts of files and folders, Introduction to Operating systems, Different types of operating systems: single user, multitasking, time-sharing multi-user; Booting, POST; Basic features of two GUI operating systems: Windows & Linux (Basic desk top management); Programming Languages, Compiler, Interpreter, Databases; Application software: Generic Features of Word processors, Spread sheets and Presentation software; Generic Introduction to Latex for scientific typesetting; Utilities and their use; Computer Viruses & Protection, Free software, open source.

Unit-IV: Computer Networks and Internet **06**

Connecting computers, Requirements for a network: Server, Workstation, switch, router, network operating systems; Internet: brief history, World Wide Web, Websites, URL, browsers, search engines, search tips; Internet connections: ISP, Dial-up, cable modem, WLL, DSL, leased line Wireless and Wi-Fi connectivity ; email, email software features (send receive, filter, attach, forward, copy, blind copy); characteristics of web-based systems, Web pages, Web Programming Languages.

Unit-V: Information Technology And Society **06**

Indian IT Act, Intellectual Property Rights, issues. Application of information Technology in Railways, Airlines, Banking, Insurance, Inventory Control, Financial systems, Hotel management, Education, Video games, Telephone exchanges, Mobile phones, Information kiosks, special effects in Movies.

Programming Concepts & Techniques: Program Concept, Characteristics of Programme, Stages in Program Development, Tips for Program Designing, Programming Aids, Algorithms, Pseudo code,

Notations, Design, Flowcharts, Symbols, Rules, compiler & Interpreter. Introduction to programming techniques, Top-down & Bottom-up approach, Unstructured, & Modular programming, Cohesion, Coupling, Debugging, Syntax & Logical Errors, Linking and Loading, Testing and Debugging, Documentation.

Reference Books:

1. Programming in C, R.S. Salaria, Khanna Publishing House
2. Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing House
3. Handbook of Computer Fundamentals, N.S. Gill, Khanna Publishing House

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IDENTIFICATION OF COMPONENTS, CONNECTORS, CABLES AND APPLICATIONS BVEMS103

Unit I: Passive Components **06**

Definition, why called Passive Components, Resistor – Identification value using Color coding, using numbering in case of SMD, Resistor Type – Carbon Film, Metal Film, Ceramic, Wire Wound (Fixed and Tapped), Preset (Adjustable Resistor), Potentiometer (Variable Resistor), Light Dependent Resistor, Thermistor.

Capacitor – Identification value using Color coding, using numbering in case of SMD, Type – Non-Polar – Ceramic (Disc), Polyester, Paper, Mica, Adjustable Capacitor – Trimmer (Adjustable), Gang Capacitor (Variable), Polar – Tantalum, Electrolytic. Inductor – Identification value using Color coding, applications. Intermediate Frequency Transformer (IFT). Transformers – Step-up, Step-down, Isolation. Relay (Electromechanical Switch)

Unit II: Active Components **06**

Definition, why called Active Components, Diode – Diode (General Purpose), LED, Zener (Reference Voltage), Display (7-Segment), Photo Diode, PIN Diode, Schottky Diode, Tunnel Diode.

Transistor – BJT (Current Operated Device), Photo Transistor, Power Transistor, FET, MOSFET, SCR (Controlled Diode), Diac (Bidirectional AC switch), Triac (Bidirectional Controlled AC switch), IGBT

Unit: III Switches **06**

Identification and application of Mechanical Switches – SPST, SPDT, DPST, DPDT, Push Button, Toggle Switch, Limit Switch, Float Switch, Flow Switch, Pressure Switch, Temperature Switch, Joystick, Rotary Switch, Rocker Switch. Identification and application of Mechanical Switches – BJT, Photo Transistor, Power Transistor, FET, MOSFET, SCR, Diac, Triac, IGBT. Identification and application of Optocoupler.

Unit: IV Connectors **06**

Plug and socket connectors, Jacks and plugs, Crimp-on connectors, Soldered connectors, Insulation-displacement connectors, Binding posts, Screw terminals, Ring and spade connectors, Blade connectors etc.

Unit: V Cables **06**

Identification and application of cables – Metallic Sheathed and Non-metallic Sheathed cable, Un-grounded and Grounded Power Supply Cable, multi-conductor Cable, Coaxial Cable, Shielded and Unshielded Twisted Pair Cable, Ribbon Cable, Armoured and Unarmoured Cable, Twin-Lead Cable, Twin Axial Cable, Optical fiber Cable

Recommended Text Books:

1. R. Hunt And Shell Y.,Computers And Commonsense, BPB Publications
2. V.Rajaraman, Computer Fundamentals, PHI Learning

Reference Books:

1. Ashok Arora, Fundamentals of Computer Systems.
2. Russell A Stultz, Fundamentals of Computer Systems

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BASIC INSTRUMENTATION

BVEMS104

Unit I: Fundamentals of measurement **06**

Need of Instrumentation, General Instrumentation System, Static and Dynamic characteristics of instruments, input & output impedance, loading effects of series and shunt connected instruments, Fundamentals of measurements, Types of Errors, Statistical Analysis, Probability of Errors, Limiting Errors, Calibration of instruments, calibration report & certification, traceability and traceability chart

Unit II: Analog Indicating Instruments **06**

DC galvanometer, PMMC and Moving Iron instruments, voltmeters, ammeters, ohmmeters and extension of range of instruments, AC indicating instruments: EDM type instruments, EDM Wattmeter (single phase) and errors present,1 Φ induction type energy meter, Potential and current transformers, DC Potentiometers, standardization, applications of DC potentiometer

Unit III: Bridge Circuits **06**

DC bridges: Wheatstone bridge and Kelvin bridge design, bridge sensitivity, errors in bridge circuits, null type and deflection type bridges, current sensitive and voltage sensitive bridges, applications of DC bridges AC bridges: Quality factor (Q) and dissipation factor(D), General equations for bridge balance, detectors for AC bridges, Maxwell bridge, Hay bridge, Schering bridge, Wien bridge, applications of AC bridges

Unit IV: Oscilloscope **06**

Introduction, General purpose oscilloscope Block Diagram, Cathode Ray Tube, Vertical Deflection System, Horizontal Deflection System, deflection sensitivity, front panel controls, Delay Line, Oscilloscope Probes, Dual trace CRO,ALT and CHOP modes, measurement of electrical parameters like voltage, current, frequency, phase, Zmodulation, Digital Storage oscilloscope, sampling rate and bandwidth, roll mode, applications like pretrigger, post-trigger, zoom and restart

Unit V: Digital Instruments **06**

Introduction to digital instruments, Advantages of Digital instruments over Analog instruments, Block diagram, principle of operation, Accuracy of measurement: Digital Multi meter, Kilo Watt Hour meter, Digital Tachometer, Ultrasonic Distance meter, Digital Thermometer, Digital pH meter, Digital capacitance meter.

Recording Instruments and Waveform Generation

Classification of recorders, Principle and working of strip chart and X-Y recorders, single and multi-channel recorders, driving systems for pen and chart, applications of recorders, Waveform generation methods, Function generator

Recommended Text and Reference Books:

1. Sawhney A. K., Electrical and Electronics Measurements and Instruments
2. W. D. Cooper & A. D. Helfrick, „Electronic Instrumentation and Measurement Techniques", PHI
3. Kalsi H. S., „Electronic Instrumentation", TMH, 2nd or 3rd e/d

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SEMESTER - II

FUNDAMENTAL OF ELECTRICAL

BVEMS201

Unit I: Current Electricity **06**

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 **06**

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 **06**

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 **06**

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.

Unit V: Single Phase Transformer: **06**

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.

Recommended Text and Reference Books:

1. Fundamentals of Electrical Engg. & Electronics, B. L. Theraja
2. Electrical Science, Vandana Singhal
3. Principle of Electrical Engineering, B. R. Gupta

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ENVIRONMENTAL STUDIES

BVEMS202

Unit I: Introduction to Environmental Studies **06**

- Multidisciplinary nature of environmental studies
- Scope and importance; Concept of sustainability and sustainable development.

Ecosystems

What is an ecosystem? Structure and function of the ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:

a) Forest ecosystem

b) Grassland ecosystem

c) Desert ecosystem

d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit II: Natural Resources : Renewable and Non--renewable Resources **06**

- Land resources and landuse change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water : Use and over--exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter--state).
- Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit III: Biodiversity and Conservation **06**

- Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega--biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity : Habitat loss, poaching of wildlife, man--wildlife conflicts, biological invasions; Conservation of biodiversity : In--situ and Ex--situ conservation of bi odiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit IV: Environmental Pollution **06**

- Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management : Control measures of urban and industrial waste.
- Pollution case studies.

Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Unit V: Human Communities and the Environment **06**

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management : floods, earthquake, cyclones and landslides.
- Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Suggested Readings:

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R.1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999.*Global Ethics and Environment*, London, Routledge.
4. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll.*Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science,* 339: 36--37.
7. McCully, P. 1996. *Rivers no more: the environmental effects of dams*(pp. 29--64). Zed Books.
8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the

Twentieth Century.

9. Odum, E.P., Odum, H.T. & Andrews, J. 1971.*Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012.*Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India*. *Tripathi 1992*.
14. Sengupta, R. 2003. *Ecology and economics*: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology*: *Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998*. Land of the Tiger*: *A Natural History of the Indian Subcontinent*.
18. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. 2006.*The Creation: An appeal to save life on earth*. New York: Norton.
20. World Commission on Environment and Development. 1987.*Our Common Future*. Oxford University Press.

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SOLDERING & DE-SOLDERING OF COMPONENTS

BVEMS203

Unit I: Soldering Tools **06**

Different types of Soldering Guns related to Temperature and wattages, types of tips, Solder materials and their grading.

Unit II: Soldering and De Soldering Stations **06**

Soldering and De Soldering Stations and their Specifications, Preparing Component for Soldering.

Unit III: PCB **06**

PCB Applications, Types of PCB, Soldering Basic Components on PCB.

Unit IV: De soldering tools **06**

De-soldering Basic Components, Safety precautions while Soldering & De soldering, Check for cold continuity of PCB.

Unit V: Identification of Faults **06**

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

Recommended Text and Reference Books:

1. Bruce R. Archambeault and James Drewniak, PCB Design for Real-World EMI Control, Springer Science
2. Kraig Mitzner, Complete PCB Design Using OrCad Capture and Layout, Newnes Pub

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PRINCIPLE OF ELECTRONICS

BVEMS204

Unit I: Overview of Atom **06**

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 **06**

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 **06**

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, γrelation. 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.

Unit IV: Transistor Amplifier and Applications **06**

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

Unit V: Opto Electronics **06**

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

Recommended Text and Reference Books:

1. Principle of Electronics, V. K. Mehata.
2. Fundamentals of Electronics, D. Chattopadhay / P. C Rakshit

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INDUSTRIAL TRAINING/ ON JOB TRAINING/ WORKSHOP

BVEMS205P

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SEMESTER - III

TOOLS, EQUIPMENT & SAFETY MEASURES

BVEMS301

Unit I: Tools & Equipment **06**

Study of all types of tools used in manufacturing

Classification, Specification and material of cables: Non-metallic Sheathed Cable, Un-grounded / grounded Power supply cable, metallic Sheathed Cable, Multi-Conductor Cable, Coaxial Cable, Unshielded Twisted Pair Cable, Shielded twisted pair cable, Ribbon Cable, Armored & Unarmored Cable, Twin-Lead Cable, Twin Axial Cable, Optical fiber cable.

Unit II: Equipment **06**

Study of all equipment required and deployed in manufacturing.

Study of Connectors and sockets for all types of cables and electrical devices

Unit III: Installing & servicing processes **06**

Installing & servicing, Identification and termination process, General maintenance of tools/equipment and recalibration of Test equipment, General safety and common Sense safety.

Unit IV: PPE **06**

Usage & benefits of PPE, Electronics Manufacturing Services and Types & usage of Various PPE, Maintenance of PPE.

Unit V: Clean Room Environment **06**

Do's and Don'ts and Shop Floor Discipline

ESD Clothing: What to wear, how to wear

Recommended Text and Reference Books:

1. John Cadick, Mary Capelli- Schellpfeffer, Dennis Neitzel, Electrical Safety Handbook 3E Delmar Publishers
2. W Fordham Cooper Electrical Safety Engineering Newnes-Butterworths
3. Andrew S. Tanenbaum, David J. Wetherall , Computer Network, Pearson
4. Albert D. Helfrick, William David Cooper, Modern Electronic Instrumentation and Measurement, PHI

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ELECTRONICS DEVICES AND CIRCUIT

BVEMS302

Unit I: Rectifier & Regulated Power Supply **06**

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 trippler, 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 runway and its prevention, heat sinks.

Unit II: Small signal transistor & special purpose Amplifiers **06**

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.

Unit III: Feed back & Tuned Amplifier **06**

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, ABand 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 **06**

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.

Unit IV: Differential Amplifier **06**

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.

Recommended Text and Reference Books:

1. Integrated Electronics. J. Mill man & Haking

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FUNDAMENTAL OF TROUBLESHOOTING ELECTRONIC EQUIPMENT

BVEMS303

Unit I: Fundamental Troubleshooting Procedure **06**

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

Unit II: Tools, Aids, Test equipments for servicing and maintenance **06**

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.

Unit III: Preventive Maintenance **06**

Indications of Preventive Maintenance Action, Preventive Maintenance of Electronic Circuit, Preventive Maintenance of Mechanical Systems, General guidelines for cleaning and lubricating.

Unit IV: Maintenance Management **06**

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.

Unit V: Installation Procedures **06**

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.

Recommended Text and Reference Books:

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

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MOBILE & SMARTPHONE

BVEMS304

Unit I: Basics and Basic Electronics **06**

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).

Unit II: Hardware Repair **06**

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.

Unit III: Software Repair **06**

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.

Unit IV: Basic Troubleshooting **06**

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.

Unit V: Advanced Troubleshooting **06**

Circuit tracing, jumper techniques and solutions. Troubleshooting through schematic diagrams. Use of internet for troubleshooting faults. Advanced troubleshooting techniques.

Recommended Text and Reference Books:

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

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SEMESTER - IV

DIGITAL ELECTRONICS

BVEMS401

Unit I: Number System **06**

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 **06**

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: **06**

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 Resisters: Asynchronous counter (Ripple). Synchronous counter (parallel). Up counter, Down Counter, Up - Down Counter, MOD - N - Counter. Presettable 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.

Unit IV: D/A and A/D conversion **06**

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

Unit V: Memory Organization **06**

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).

Recommended Text and Reference Books:

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

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FAULT ANALYSIS & REPAIR

BVEMS402

Unit I: Fault Classification, Identification & Rectification **08**

Classification of fault, Identification of fault, Rectification of fault, Repairing/Replacing Module

Unit II: Analysis for the different types of equipment **08**

- Smartphone
- Air Conditioning
- Security systems
- Electronically controlled doors

Unit III: Hardware and Software Fault Analysis **07**

Hardware and Software Fault analysis based on hardware and software components, Diagnostic and Testing Methods

Unit IV: Visual Inspection **07**

- Earth Continuity Test
- Insulation Resistance Test

Recommended Text and Reference Books:

1. R. S. Khandpur, Troubleshooting Electronic Equipment, McGraw-Hill Education
2. Philip Kiameh Electronic Equipment Handbook McGraw-Hill Education

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TROUBLESHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENT

BVEMS403

Unit I: Washing machine **06**

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.

Unit II: Microwave oven **06**

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

Unit III: Steam Iron: **06**

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.

Unit IV: Mixer & Grinder: **06**

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.

Unit V: Induction cooker **06**

Principle of Induction heating, Construction, Working and troubleshooting.

Electric kettle: Identify various components of Electric kettle, controls and trace the circuit and rectify the simulated faults.

Recommended Text and Reference Books:

1. Eric Kleinert, Troubleshooting and Repairing major appliances, McGrawHill, McGraw Hill Professional, third edition, 2012.

2. Modern Washing Machine Servicing, Manahar Lotia

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MICROPROCESSOR

BVEMS404

Unit I: Micro - computer, Micro - Processor and Assembly Language **06**

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.

Unit II: Introduction of 8085, Basic instructions, Timings **06**

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.

Unit III: Timing Diagram Technique **06**

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.

Unit IV: Stack, Subroutines and interrupts **06**

Sack, subroutine, Conditional call and return instruction, Advanced subroutine concept. The 8085 interrupt.

Unit V: Introduction of Data Transfer Schemes **06**

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.

Recommended Text and Reference Books:

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

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INDUSTRIAL TRAINING/ ON JOB TRAINING/ WORKSHOP

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SEMESTER - V
ENTREPRENEURSHIP DEVELOPMENT PROGRAMME
BVEMS501

Unit I: **06**

To make the students understand about entrepreneurs and different classifications. Entrepreneur and entrepreneurship - Definition; traits and features; classification; Entrepreneurs; Women entrepreneurs; Role of entrepreneur in Entrepreneurs in India, Create an awareness about EDP. Entrepreneurial development programme concept; Need for training; phases of EDP; curriculum & contents of Training Programme; Support systems, Target Groups; Institutions conducting EDPs in India and Kerala.

Unit II: **06**

General awareness about edeutification of project financing new enterprises; Promotion of a venture; opportunity Analysis Project identification and selection; External environmental analysis economic, social, technological an competitive factors; Legal requirements for establishment of a new unit; loans; Over rum finance; Bridge finance; Venture capital; Providing finance in Approaching financing institutions for loans.

Unit III: **06**

To identify different Discuss opportunities in small business; Small business Enterprise - Identifying the Business opportunity in various sectors - formalities for setting up of a small business enterprise

Unit IV: **06**

Institutions supporting small business enterprise - EDII (Entrepreneurship Development Institute of India), SLDO (Small Industries Development Organization NSIC (National small Industries Corporation Ltd. (CNSIC) NIESBUD (National Institute for Entrepreneurship and small Business Development) Sickness in small business enterprise causes and remedies.

Unit V: **06**

To understand about a project report relating to a small business; Project formulation - Meaning of a project report significance contents formulation planning commissions guidelines for formulating a project report - specimen of a project report, problems of entrepreneurs case studies of entrepreneurs.

Recommended Text and Reference Books:

1. Cliffton, Davis S. and Fylie, David E. , Project Feasibility Analysis, John Wiley, New York, 1977.
2. Desai A. N., Entrepreneur and Environment, Ashish, New Delhi, 1990.
3. Drucker, Peter, Innovation and Entrepreileurship, Heinemann, London, 1985
4. Jain Rajiv, Planning a Small Scale Industry: A guide to Entrepreneurs, S. S. Books, Delhi, 1984
5. Kumar S. A. , Entrepreneurship in Small Industry, Discovery, New Delhi, 1990
6. McCleffand, D. C. and Winter, W. G. , Motivating Economic Achievement, Free Press, New York, 1969

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MANUFACTURING & QUALITY NORMS

BVEMS502

Unit I: Manufacturing & Quality Norms – Part_A **08**

Manufacturing & Quality Norms- keep it differently according to all applications, Manpower Deployment and Operations as per Work Instructions and criticality of the process Understanding how to form each operation and practical training of operation, Understanding accept and reject criterion of a particular operation.

Unit II: Manufacturing & Quality Norms – Part_B **08**

Process in packing line-Packing line Operations sequence flow and its importance, Quality Systems - Accept, Reject criterion of various tests at OQA, Training of Assembly of electronic components - Assemble, Check, test electronic components , Various Labels and their Importance - Understanding Labels, Scanning and its importance , Packing of components/devices - Various Stages of packing, acceptance.

Unit III: Training of Testing **07**

Practical training of testing/checking each operation, Quality Norms of accept and practical training of electronic equipment's/Devices Acceptance/Rejection training of various defects

Unit IV: Rejection Norms **07**

Reject and sampling following QA norms - AQL level, sampling techniques, as per QA sampling accept, reject numbers

Recommended Text and Reference Books:

1. Charles A. Cianfrani, John E. West, ISO 9001:2015 Explained, ASQ Quality Press
2. Denise E. Robitaille, ISO 9001:2015 Handbook for Small and Medium-sized Businesses, ASQ Quality Press

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ELECTRONICS SYSTEM PACKAGING AND MANUFACTURING BVEMS503

Unit I: Evolution and Classification of Printed Circuit Boards **08**

Challenges in Modern PCB Design and Manufacture, PCB fabrication methodologies (SSB, DSB and multilayer board), PCB design considerations/ design rules for analog, digital, and power applications

Unit II: Electromagnetic interference in electronic systems and its impact **08**

Analysis of electronic circuit from noise emission point of view (both conducted and radiated emission) cross talk and reflection behavior of the circuit in the time domain, Thermal management of electronic devices and systems.

Unit III: Semiconductor Packages **07**

Single-chip packages or modules. (SCM) Commonly used packages and advanced packages; Materials in packages, Current trends in Packaging, Multichip modules (MCM)-types; System-in package (SIP); Packaging roadmaps

Unit IV: Hybrid circuits **07**

Pipe and FIFOs, Shared memory, Sockets

Recommended Text and Reference Books:

1. Glenn R. Blackwell The Electronic Packaging Handbook CRC Press
2. Yong Liu Power Electronic Packaging Design, Assembly Process, Reliability and Modeling Springer New York

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SOLAR AND LED TECHNICIAN

BVEMS504

Unit I: Conditions, collect tools and raw materials **08**

Understand the work requirement, Site condition, Understand the installation requirement, Materials required for installation, Quality material usage and appropriate handling mechanism

Unit II: Installation **08**

Installation and material usage procedure, mounting requirements, Connection of the system and functioning, Report and document completion of work, Quality and safety procedures

Unit III: Coordination **07**

Company's policies on: Incentives, Delivery standards, and personnel management, Importance of the individual's role in the workflow, Reporting structure, How to communicate effectively, How to build team coordination

Unit IV: Safety and Precaution **07**

How to maintain the work area safe and secure, How to handle hazardous material, How to operate hazardous tools and equipment, Emergency procedures to be followed such as fire accidents, etc.

Recommended Text and Reference Books:

1. Adrian Kitai, Principles of Solar Cells, LEDs and Diodes, Wiley
2. Gregory F. Nemet How Solar Energy Became Cheap: A Model for Low-Carbon Innovation, Routledge

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BVEMS505P

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SEMESTER - VI

RESEARCH METHODOLOGY

BVEMS601

Unit I: Foundations of Research **08**

Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method - Understanding the language of research - Concept, Construct, Definition, Variable. Research Process (10%)

Unit II: **08**

Problem Identification & Formulation - Research Question - Investigation Question - Measurement Issues - Hypothesis - Qualities of a good Hypothesis - Null Hypothesis & Alternative Hypothesis. Hypothesis Testing - Logic & Importance (10%)

Unit III: Research Design **07**

Concept and Importance in Research - Features of a good research design - Exploratory Research Design - concept, types and uses, Descriptive Research Designs - concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.

Unit IV: Qualitative and Quantitative Research **07**

Qualitative research - Quantitative research - Concept of measurement, causality, generalization, replication. Merging the two approaches.

Recommended Text and Reference Books:

1. Research methodology by P. K. Manoharam
2. Research methodology by Dr. C. Rajindra Kumar
3. Research methodology methods and techniques by C. R. Kothari

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GOOD MANUFACTURING CONCEPT & PRACTICES BVEMS602

Unit I: Quality Management **08**

- TQM (Total Quality Management) & Kaizen
- Inventory Management & Logistics in brief

Unit II: Quality Assurance **08**

- Implementation of Quality assurance
- Checklist for Quality Assurance

Unit III: Quality Analysis **07**

- SWOT analysis
- Lean Manufacturing

Unit IV: The 3M Model **07**

- Muda, Mura & Muri – Toyota Production System (TPS)
- Spatial considerations & other related concepts

Recommended Text and Reference Books:

1. David Meier, Liker The Toyota Way Field book McGraw-Hill Education (India) Pvt Limited
2. P. N. MUKHERJEE Total Quality Management PHI Learning

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UPS AND INVERTER TECHNICIAN

BVEMS603

Unit 1 Introduction **08**

Introduction to Inverter, Block diagram of Inverter, Rectifier, its type and working principle

Unit 2 Working of Invertor **08**

PIV of Diode, Filter employed in rectifier Battery charger circuit, working of Inverter Oscillator, type of Oscillator, Square wave Generator PWM

Unit 3 Designing Invertors Part A **07**

DC to AC Convertor/Invertor, Designing an investor

Unit 4 Designing Invertors Part B **07**

Circuit using PWM UPS, Working principle, specifications, explanation with the help of block diagram, UPS Installation Find the total Load and Select suitable Inverter/UPS

Recommended Text and Reference Books:

1. Abraham Pressman, Switching Power Supply Design
2. National Instructional Media Institute, Chennai, Repair & Maintenance of Power supply, Invertor & UPSNIMI

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PC SOFTWARE

BVEMS604

Unit I: DOS **08**

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.

Unit II: Word Processing Package **08**

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.

Unit III: Spreadsheet Package **07**

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.

Unit IV: Presentation Packages **07**

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.

Recommended Text and Reference Books:

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

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