Sri Ramakrishna Mission Vidyalaya College of Arts and Science
Coimbatore – 641020

(An Autonomous College Re-Accredited with "A" grade by NAAC and Affiliated to Bharathiyar University, Coimbatore)

B.Voc., Degree course (Three years)

Technology in Electrical and Electronic Devices

(An UGC sponsored DDU-KAUSHAL KENDRA Programme)

SYLLABUS

(ACADEMIC YEAR 2016-2017 Onwards)

Sri Ramakrishna Mission Vidyalaya College of Arts and Science
(AUTONOMOUS)

For Students admitted from 2016-2017 & onwards

COURSE OF STUDY

- Syllabus is framed for B.VOC (Technology in Electrical and Electronic Devices) according to UGC norms and National Vocational Education Quality Framework
- There are 2 components. They are General components of 24 credits and Skill components of 36 credits.
- One credit is equal to 15 hours for theory and 30 hours for practical. Practical could be either in the campus or in the working place of the Industry.

ELIGIBILITY:

- Candidates who have successfully completed their Higher Secondary (10+2) will be eligible for admission.

BASICS OF ELECTRICAL AND ELECTRONIC DEVICES

Course code	16KUTE101	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

OBJECTIVES:

- Basic concepts of AC and DC circuits, series and Parallel connections
- Basic concepts of AC and DC machines.
- Construction, working, Characteristics and specifications of Electronic devices.

OUTCOMES:

- Student will be able to handle Electrical machines and Electronic devices safely.

UNIT I: FUNDAMENTALS OF ELECTRICITY

Definition and Units of Voltage, Current, Potential Difference, Power, Energy, Resistance, Conductance, Resistivity - Concepts of open and short circuit - Ohm's Law –Kirchoff's Current and Voltage law (Definition only) - Series circuits - Parallel circuits – Series Parallel Circuits – Simple problems on Ohm's law. AC and DC circuits-sources and its applications - Definition of cycle, frequency, time period, amplitude, peak value, average value and rms value – Define peak factor and form factor - Concept of phase , phase difference and phase angle – Single phase and 3 phase (Definition) - Meaning of lagging and leading sine wave - Advantages of three phase over single phase

UNIT II: D.C. MACHINES AND TRANSFORMERS

DC Generator – construction- Working principle - characteristics–types- Applications DC motor- construction- Working principle - characteristics–types- Applications Necessity of starter - 3 point starter, 4 point starter

Single Phase transformer: Working Principle and Construction of transformer ––– Applications – Step up and Step down transformer (Definition only)

UNIT III: A.C.MACHINES

Single phase Induction motor - construction & principle of operation-Types

Three phase induction motors – Squirrel cage and slip ring Induction motors (construction and working principle only)

Alternator- construction – Principle of operation

Necessity of starters – DOLand star/delta, auto transformer -application

UNIT IV: ELECTRONICS DEVICES

Types of materials – Conductor, semiconductor, insulator

DIODES: Working principle and characteristics of PN junction diode – Zener diode – Varactor diode – its specification.

TRANSISTOR: Working principle and characteristics of BJT- FET-UJT - types and specification.

POWER ELECTRONIC DEVICES: Working principle and characteristics of SCR- DIAC-TRIAC – IGBT - types and specification.

OPTOELECTRONIC DEVICES: Working principle and characteristics of LDR- LED-Photo Transistor – Photo Diode – Thermister- types and specification.

UNIT V: ELECTRONIC CIRCUITS

RECTIFIER: Construction, working and output waveform of half wave rectifier – Full wave rectifier – Bridge rectifier – its Application.

WAVE SHAPING CIRCUIT: Clipper – clamper – voltage doubler – multivibrator and its types.

REGULATED POWER SUPPLY: Need of RPS – Block diagram of RPS – Transistorized RPS – short circuit protection.

REFERENCE BOOKS:

- Electric Circuit Theory Dr.M.Arumugam Dr.N.Premkumaran Khanna Publishers, New Delhi
- Electrical machines - K.Bhattacharya, Principal, TTTI, Chandigar Tata McGraw Hill Publishing Company, New Delhi
- A course of Electrical Engineering -B.L.Theraja, S.Chand and Co., New Delhi
- Electronic Devices and Circuits - Salivahanan, N.Sureshkumar and A.Vallavaraj Tata McGraw Hill Publishing Company, New Delhi.
- Electrical Equipment Handbook: Troubleshooting & Maintenance, The Mc Graw-Hill, Company,Inc

SUPERVISE ASSEMBLY LINE ACTIVITIES

Course code	16KUTE202	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

OBJECTIVES:

- Understand responsibilities of Supervisor
- Understand the concept of Production Planning.
- Safety Guidelines for Handling Electronic Assemblies
- Improve productivity by Time management

OUTCOMES:

- Student will be able to develop the Supervisory skills.
- Student will be able to work safely in Electronic assembly section.

UNIT I: SUPERVISOR RESPONSIBILITIES

Introduction – Responsibilities to the middle and top management - Responsibilities to the Co workers - Responsibilities to the other supervisor - Responsibilities to the staff – Responsibilities in Labor matter.

UNIT II: SUPERVISORY SKILLS

Communication with others – planning process – Technical competence – Team work and sharing of Knowledge – Training and development of workers – maintain workers discipline and productivity – Department administration – duty routine activities.

UNIT III: HANDLING ELECTRONIC ASSEMBLIES

EOS/ESD PREVENTION: Electrical Overstress (EOS) – Electrostatic Discharge (ESD) – Working cables – Protective materials – EOS/ESD safe workstation.

HANDLING CONSIDERATION: Guidelines – physical damage – contamination – Electronic Assemblies- After soldering – gloves & finger cots.

UNIT IV: ELECTRICAL SAFETY

Theory of Electricity – Hazards of Electricity – Effects of Electricity on Human body – common workplace circuits – Electrical protective devices – Grounding.

UNIT V: TIME MANAGEMENT

Introduction – Goal setting – tools for prioritization –managing interruptions – managing procrastination – scheduling.

REFERENCE:

- Training manual on supervisory skills – WOPAC training and service center, cebu, Phillipines
- Production and Operations Management – Pannerselvam, PHI
- Acceptability of. Assemblies – developed by IPC (IPC-A-610D)
- Successful Time management – www.bookboon.com

LINEAR INTEGRATED CIRCUITS

Course code	16KUTE203	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

OBJECTIVES:

- Fundamentals of Op-amp.
- Applications of Op-amp.
- Working and application of Timer IC

OUTCOMES:

- Student will be able to analyze the Linear integrated circuits.

UNIT I: OPERATIONAL AMPLIFIER

Introduction to Op-amp (IC 741) – Schematic symbol for opamp – pin diagram of IC 741 – Block diagram of an opamp – Characteristics of an Ideal opamp - Simple Equivalent circuit of an opamp –op amp parameters – CMRR –Slew rate - virtual ground.

UNIT II: OPAMP APPLICATIONS

Inverting Amplifier, Non Inverting amplifier – Differential Amplifier – scale changer as a Multiplier and Divider - Summing amplifier (Simple problems)- Voltage follower - comparator - zero crossing detector - Integrator – Differentiator – Voltage to current converter – current to voltage converter –Instrumentation amplifier.

UNIT III: DIGITAL TO ANALOG CONVERTER

Basics of D/A conversion – weighted Resistor D/A Converter – R-2R Ladder D/A Converter –Specifications of DAC-Accuracy, Resolution, Monotonocity, Settling time.

UNIT IV: ANALOG TO DIGITAL CONVERTER

Basics of A/D conversion – sampling –Sample and hold circuit –quantization – Types of A/D converter – Block diagram of Flash, Successive approximation, Ramp, Dual Slope ADC – Specifications of ADC – Accuracy, Resolution, conversion time –Functional Block diagram of IC ADC 0808.

Unit V: IC555 TIMER, IC VOLTAGE REGULATORS AND THEIR APPLICATIONS.

IC 555 Timer: Pin diagram of IC 555 – Functional Block diagram of IC555 – Applications – Astable multivibrator – monostable multivibrator – Schmitt trigger – sequence Timer

IC voltage regulators: Linear fixed voltage regulator - Positive voltage regulator using IC 78xx, negative voltage regulator using IC 79xx – Adjustable voltage Regulator LM 317.

General purpose regulator using LM 723 – Pin diagram of LM 723- Low voltage and High voltage regulator using LM 723.

REFERENCE:

- Linear Integrated circuits – D.Roy choudhury & Shail.B. Jain – New age Int. Publishers – II Edition
- "Integrated circuits" – K.R. Botkar – Khanna Pulbisher's – 1996

PRINCIPLES OF MANAGEMENT

Course code	16KUGE307	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	III

OBJECTIVES:

To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

UNIT I: INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

Definition of Management – Science or Art – Manager Vs Entrepreneur – types of managers – managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization – Sole proprietorship, partnership, company-public and private sector enterprises – Organization culture and Environment – Current trends and issues in Management.

UNITII: PLANNING

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

UNIT III: ORGANISING

Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design – Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.

UNIT IV: DIRECTING

Foundations of individual and group behavior – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication and IT.

UNIT V: CONTROLLING

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

TEXT BOOKS:

1. Stephen P. Robbins & Mary Coulter, " Management", Prentice Hall (India) Pvt. Ltd., 10th Edition, 2009.
2. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Edition, 2004.

DIGITAL ELECTRONICS

Course code	16KUTE304	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	III

OBJECTIVES:

- Understand concepts of Number systems and codes
- Fundamentals of Digital Electronics.
- Understand the Digital logic circuits
- Basics of memories

OUTCOMES:

- Student will be able to analyze the Digital logic circuits.

UNIT I : NUMBER SYSTEMS AND CODES

Number systems: Types - Decimal – Binary – Octal – Hexadecimal – BCD – Conversion from one number system to other.

Binary Arithmetic: Binary addition- Subtraction- 1's complement and 2's complement – Signed binary numbers- Binary addition and subtraction using1's complement and 2's complement- 9's complement and 10's complement.

CODES: Types- Binary codes, Excess 3 code, Gray code – conversion from one code to another code.

UNIT II: BOOLEAN ALGEBRA AND LOGIC GATES

Logic gates: Positive and Negative logic System - Definition, Truth table, Symbol and Logical equations of AND – OR - NOT – EXOR - EXNOR (Only 2-inputs) gates –Universal gates - NAND - NOR – Symbol and truth table .

Boolean Algebra : Basic laws of Boolean algebra – Demorgan's Theorem and proofs – Duality theorem - Simplification of logical equations using Boolean laws - De-Morgan's theorem – Four variable Karnaugh map

UNIT III: COMBINATIONAL LOGIC CIRCUITS

Half Adder and full adder- Truth table, Logic diagram – Half subtractor and Full subtractor - Truth table, Logic diagram Parity bit – Use of a parity bit – Odd parity and Even parity

Multiplexer - De multiplexer – Encoder – Decoder (Definition and Basic Circuits only) – Comparator Circuit for two three bit words.

UNIT IV: SEQUENTIAL LOGIC CIRCUITS

Flip flops: Basic principle of operation - S-R, D flip-flop – Operation and truth table - Race Condition – JK flip flop – T flip flop – Toggling - Edge Triggered Flip-flop –J-K Master Slave flip flop.

Counters: Asynchronous counter - 4 bit Asynchronous Counter – Mod N Counter - Decade counter - Synchronous counter - 4 bit Synchronous binary counter – Up and Down Counter - Applications of Counters

UNIT V: REGISTERS AND DIGITAL MEMORIES

Shift register - Block diagram representation and waveforms of Serial – in Serial - out, Serial – in Parallel – out, Parallel-in Serial – out, Parallel - in Parallel – out – Applications of Shift Registers.

MEMORIES – Classification of Semiconductor memories**-** Static Memory – Dynamic Memory – Static Memory organization in terms of address lines, control lines and data lines – Expanding memory (say 8k to 16k) – SDRAM – DDR RAM.

REFERENCE:

- R.P. Jain – Modern Digital Electronics – TMH 2003.
- Albert Paul Malvino and Donald P. Leach – Digital Principles and applications –TMH – 1991.

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TECHNICAL DRAWING

Course code	16KUGE408	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Objectives:

At the end of the semester the student must be able to draw

- 2D diagrams using Auto CAD
- Symbols widely used in Electrical and Electronics circuits

Unit I- Introduction to AutoCAD

History of AutoCAD-Applications- Advantages over manual drafting - hardware requirements – software requirements – window desktop – AutoCAD screen interface – menus – toolbars - How to start AutoCAD – command groups – How to execute command – types of coordinate systems – absolute-relative-polar.

Unit II -Text and Dimensioning

Auto CAD importance, Auto CAD Tools, Drafting and Unit settings, Auto CAD commands, Types of Lines and Layers -Simple Sketches (lines and curves)

Single text and multi text- Basic dimensioning – editing dimensions – dimensions styles – dimensioning systems variables.

Unit III - Geometrical construction

-Triangle (Equilateral triangle, Right angle triangle, Isosceles triangle, Acute triangle) - Rectangle, Rhombus, Trapezium,-Circles (AutoCAD Relevant) -Regular Polygons (Square, Pentagon, Hexagon, Heptagon, Octagon)-Parabola (Tangent method, Offset method)-Ellipse (Parallelogram method, Four centre method, Concentric circles method)-Hyperbola-Cycloids - Involutes -Helix -Spiral curves.

Unit IV-Projections

Orthographic (first angle and third angle) (10 simple exercises each) - Isometric (5 simple exercises)- (Different types of machine parts- 2D and 3D wire frame models- Solid figures) - Oblique (2D and 3D wire frame models) (3 simple exercises) - Blue print reading (Missing views - Missing Lines - Missing dimensions)

Unit V -Electrical and Electronics Symbols

Draw symbols of – DC armatures – alternators – field winding shunt, series and compound – relays – contactors – fuses – main switch – electric bell – earth – aerial – DPST – DPDT – TPST – Network link – ammeters – voltmeters – wattmeter – energy meters – frequency meters – power factor meters – timers – buzzers – transformers – auto transformers Incandescent lamp, Fluorescent Lamp, Signal lamp, Push button, Fire alarm ,Siren, Water Heater, Ceiling Fan, Exhaust Fan.

Draw symbols of Resistors – inductors – capacitors - diodes – transistors – FET – SCR – UJT – DIAC – TRIAC – MOSFET'S - LOGIC GATES – AND – OR – NOT – NAND – NOR – EXOR

Text Books:

1) Gopalakrishnan K.R., "Engineering Drawing" (Vol I & II combined), Subhas stores, Bangalore -2007

2) Shah M.B., and Rana.B.C., " Engineering Drawing", Pearson, 2nd edition, 2009.

PROFESSIONAL ETHICS AND HUMAN VALUES

Course code	16KUGE409	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Objectives:

- Understand what morality is and how it connects to professional ethics
- Understand the features of moral reasoning, moral explanations and the role of moral theories
- Develop a case resolution model for resolving moral dilemmas faced by professionals

Unit I: Business Ethics

Conceptual approach – Emerging issues – Importance of Ethics – Understanding Ethics – Ethical decision making – Moral problem

Unit II: Managing Ethical Organization

Elements of ethical organization – Manager's role in influencing ethical climate - Codes of ethics – Codes of Contact – Ethical leadership – Ethical organization

Unit III: Business ethics in Profession

Ethical concern in Human Resource Management (HRM) – Ethical issue in marketing and advertising – Marketing ethics – Ethics in production management – work ethics

Unit IV: Corporate Governance and social responsibility:

Corporate Governance – Company management – Factors for success – Social responsibility towards stakeholders – Social responsibility of business

Unit V: Human Values

Wisdom Management – A person of character – Knowledge Management – Understanding success – Stress management

Text Book:

Business Ethics and Global Values by S.K Bhatia, Deep & Deep Publication Pvt. Ltd., New Delhi

DEVELOP PROCUREMENT SCHEDULE

Course code	16KUTE405	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	IV

OBJECTIVES:

- To understand the concepts of Procurement
- To understand the customer requirement
- To plan and control the material Requirement
- To understand the concept of Purchasing

OUTCOMES:

- Student will be able to understand the customer demand.
- Student will be able to prepare the procurement schedule by co-ordinate with procurement team.

UNIT I: PROCUREMENT

Introduction – Procurement process – Plan procurement – conduct procurement - Administer the contract – Contract close out-Activities-Inputs – Tools & Techniques - outputs

UNIT II: MANAGING CUSTOMER

Empowered customers – customer life cycle – Types of customer – customer orientation – customer management – strategies – customer Acquisition – customer sacrifices – sources of values – New customer – Strategies for customer Acquisition – phases of customer development – strategies for customer retention – strategies for terminating customer relationship.

UNIT III: MATERIAL HANDLING

Introduction – objectives & principles of material Handling – Selection & Evaluation of material handling system – Guidelines for effective utilization of material handling equipment.

UNIT IV: MATERIAL MANAGEMENT

Function of material management – material planning & control – Purchasing – Stores management – Inventory control – Standardization – simplification – Value analysis – Ergonomics – JIT manufacturing.

UNIT V: PURCHASING MANAGEMENT

Introduction – purchasing organization – sourcing – strategies – purchasing portfolio models – supplier segmentation – supplier selection with focus on choice of evaluation criteria – supplier selection using ISO standards – Supplier development with quality focus.

REFERENCE:

- Procurement management manual – www.pwgsc-tpsgc.gc.ca
- Customer relationship – www.tutorialspoint.com
- Production and Operations Management – Pannerselvam, PHI
- Ebook for production and operation management – www.todaylibrary.com
- Purchasing management – Lars Bedes, Sofia Eklund, Nojan Najafi- CHALMERS-Department of Technology Management and Economics

DEVELOP PRODUCTION PLAN

Course code	16KUTE406	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	IV

OBJECTIVES:

- Understand the concept of production and operation management.
- Understand the importance of Production planning and control .
- Understand the concept of maintenance
- Benefits of inventory control

OUTCOMES:

- Student will be able to understand the customer demand.
- Student will be able to develop a production plan by co-ordinate with production team.

UNIT I: PRODUCTION AND OPERATION MANAGEMENT

Introduction – Production system – objective of Production Management – Operating system – Objectives of operation management – Managing Global operations – Scope of production and Operation management.

UNIT II: PRODUCTION PLANNING AND CONTROL

Introduction – need and objectives of PPC – Phases of PPC – Functions of PPC – Operation planning and scheduling systems – Aggregate planning – Master Production Schedule (MPS) – Material Requirement Planning (MRP) – Capacity planning – Routing – Scheduling – Scheduling Methodology.

UNIT III: MAN POWER PLANNING

Introduction- Meaning of man power planning-Importance of man power planning- Need of man power planning-Process of policy formulation-Responsibility of manpower planning- Job Analysis

UNIT IV: MAINTENANCE

Introduction – objectives – types of maintenance – maintenance planning - Maintenance Scheduling – Maintenance schedule techniques – Total Productive Maintenance.

UNIT V: INVENTORY CONTROL

Meaning of Inventory – Reasons for keeping inventory – meaning & objectives of inventory control – Benefits and techniques of inventory control – inventory model.

REFERENCE:

- Production and Operation management – S.Anil Kumar & N.Suresh – New Age International Publication.
- P.C. Tripathi, Personal Management and Industrial Relations, Sultan Chand & Sons, New Delhi, 1978 (Reprint – 2004).
- Ebook for production and operation management – www.todaylibrary.com

TOTAL QUALITY MANAGEMENT

Course code	16KUGE513	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

Unit - I INTRODUCTION

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, and Customer retention - Costs of quality.

Unit - II TQM PRINCIPLES

Leadership -Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement - PDSA cycle, 5s, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

Unit - III TQM TOOLS & TECHNIQUES I

The seven traditional tools of quality - New management tools - Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT

Unit - IV TQM TOOLS & TECHNIQUES II

Control Charts - Process Capability - Concepts of Six Sigma - Quality Function Development (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

Unit - V QUALITY SYSTEMS

Need for ISO 9000 - ISO 9001:2015, ISO 29990:2010 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors.

TEXT BOOK

1. Dale H.Besterfiled, et at., "Total Quality Management", Pearson Education Asia, Third Edition, Indian Reprint (2006).
2. Janakiraman,B and Gopal, R.K, "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. L

MICROPROCESSOR AND MICROCONTROLLER

Course code	16KUTE507	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

OBJECTIVES:

- Understand the Architecture and instruction set of 8085 microprocessor.
- Understand the Architecture and instruction set of 8051 microcontroller.
- Understand the concept of interfacing applications

OUTCOMES:

- Student will be able to understand the concept of Microprocessor and microcontroller programming.

UNIT I: 8085 MICROPROCESSOR

Introduction – terms related to microprocessor – Architecture of 8085 Microprocessor Pin-out diagram of 8085 – features – of 8085 Instruction formats – Addressing mode – instruction set – Different types of instructions.

UNIT II: 8051MICROCONTROLLER

8051 Architecture – Introduction – The 8051 Oscillator and Clock –Program Counter and Data Pointer –CPU Registers – PSW – Memory Organization – Stack – Special Function Registers –– Timers – Serial Data – Input / Output – Interrupts Structure – Timer Flag Interrupt – External Interrupt – Reset – Interrupt Control – Interrupt Priority – Interrupt Destinations –Pin Configuration of 8051 and their functions.

UNIT III: INSTRUCTIONS I

Addressing modes – Immediate Addressing modes, Register addressing modes, direct addressing modes, indirect addressing modes - Data transfer instructions – Push and Pop Opcode - Logical operations – SFR Bit addresses. Bit level Boolean operations - Rotate and Swap operations.

UNIT IV: INSTRUCTIONS II

Arithmetic instructions flags – Addition - unsigned and signed addition – Subtraction - unsigned and signed subtraction – Multiplication - Division – Detailed Arithmetic – Jump and Call Instructions – Interrupts and Returns

UNIT V: INTERFACING APPLICATIONS

Introduction – interfacing 8051 with 8255 – ADC/DAC interfacing – simple keypad interface – seven segment LED display interfacing – LCD display interfacing – interfacing sensors – interfacing of stepper motor – DC motor interfacing – interfacing traffic light controller

REFERENCE:

1. Microprocessor and Microcontroller - R. Theagarajan SciTech Publication.
2. Microprocessors and Microcontrollers - M.Senthil Kumar, M.Saravanan, S.Jeevananthan

SAFETY ENGINEERING

Course code	16KUGE615	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Unit-I Introduction

Evolution of modern safety concept- Safety policy - Safety Organization - line and staff functions for safety- Safety Committee- budgeting for safety - Risk assessment & management - Safety Education and training- Importance, various training methods – First Aid, Resuscitation, Bleeding, management of shock, Burns, scalds and accidents caused by electricity, Rescue and transport of casualty Role of management and role of Govt. in industrial safety, safety analysis.

Unit-II Safety prevention

Definitions and theories, Accident, Injury, unsafe condition, Dangerous occurrence- Cost of accidents- Accident prevention- Safety performance - Personal protective equipment- survey the plant for locations and hazards, part of body to be protected - Economic importance of accidents, Analysis of accident records, accident investigations.

Unit-III Safety in Material Handling

General safety rules, principles, maintenance, Inspections of turning machines, boring machines, milling machine, planning machine and grinding machines, CNC machines, electrical guards, work area, material handling, inspection - Heat treatment operations, paint shops, sand and shot blasting, safety in inspection and testing, pressure vessels, air leak test, steam testing, safety in radiography, personal monitoring devices, radiation hazards.

Unit-IV Shopfloor Safety

Automotive vehicle design, selection, operation and maintenance of motor vehicle - Basic automotive road Signals, Symbols, Rules and Regulation - safety on manual, mechanical handling equipment operations - Servicing and maintenance equipment grease rack operation wash rack operation - battery charging - gasoline handling - other safe practices - preventive maintenance - check lists - motor vehicle insurance and surveys.

Unit-V Electrical Safety

General principles of electric safety - Preventive maintenance - Electricity & Human body - Earthing / Grounding - Safety against over voltage, extra-low and residual voltages - Hazardous areas, Electrical insulation - Energy leakage - Electrical fires and Arc flash - Electrical causes of fire and explosion - National electrical Safety code - Safety in the use of portable tools.

Text Books:

1. C.Ray Asfahl , *Industrial Safety and Health management,* Pearson Prentice Hall,2003.
2. N.V Krishnan. *Safety Management in Industry* Jaico Publishing House, Bombay, 1997.

ENTREPRENEURSHIP DEVELOPMENT

Course code	16KUGE616	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Unit I: Entrepreneurship

Meaning, Definition, Characteristics and Functions-Role of Entrepreneur in economic development -Types-Qualities of an Entrepreneurs - Classification of Entrepreneurs-Factors Influencing Entrepreneurship – Entrepreneurship development programme – Self Employment schemes – Government policies on Entrepreneurial development.

Unit II: Institutional Finance to Entrepreneurs

State Level Financial Institutions: State Financial Corporation (SFCS) - State Industrial Development Corporation (SIDCS) – Tamilnadu Industrial Investment Corporation (TIIC) - Small Industries Promotion Corporation of Tamilnadu (SIPCOT).

All Indian Financial Institutions:

Industrial Development Bank of India (IDBI) – Industrial Finance Corporation of India (IFCI) – Industrial Credit Investment Corporation of India (ICICI) – Industrial Rural Development Bank of India (IRDBI).

Unit III: Institutional Setup to Entrepreneurs

District Industries Centre (DIC) – National Small Industries Corporation (NSIC) – Small Industries Development Corporation (SIDC) – Small Industries Service Institute (SISI) – Indian Investment Centre – Kadhi and Village Industries (KVIC).

Unit IV: Incentives and Subsidies of State and Central Government

Subsidy For Market – Capital Assistance - Subsidized Services – Taxations, Benefits to SSI – Transport Subsidy – Seed Capital Assistance – Special Facilities for imports.

Unit V: Sources of Ideas

Preliminary Evaluation and Testing of ideas – Demand based industries and Resource based industries - Project Formulation - Project Identification-Evaluation-Feasibility Analysis-Project Report.

Text Books:

1. Radha V, Entrepreneurship Development, Prasanna Publication House, 2008.
2. Khaka SS, Entrepreneurship Development, S. Chand & Co. Ltd. 2010.
3. Vasant Desai. The Dynamics of Entrepreneurship Development and Management.
4. Gupta C. B, Srinivasan N.P. Entrepreneurship Development, S. Chand & Co. Ltd. 2011.

DEVELOP HARDWARE PRODUCT FOR MANUFACTURING

Course code	16KUTE608	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

OBJECTIVES:

- To understand the concepts of Supplier selection based on material requirement
- To understand the importance of capacity, facility and process planning
- To Understand the working of Electronic testing equipments
- To Test Electronic components
- To Understand the troubleshooting procedure
- To Understand the Quality concern

OUTCOMES:

- Student will be able to select the suppliers.
- Student will be able to understand the product concept and able to decide the hardware component requirement.

UNIT I: MATERIAL REQUIREMENT AND SUPPLIER SELECTION

Introduction – material requirement planning and control – techniques of material planning – purchasing – objective and parameters of purchasing – purchasing procedure – selection of suppliers – special purchasing systems.

UNIT II: CAPACITY , FACILITY, PROCESS PLANNING AND WORK STUDY

Capacity planning – importance – capacity measurement – planning process for manufacturing and service industry

Facility planning – location facilities – location flexibility – facility design process and techniques – locational break even analysis

Process planning – procedure – characteristics of production process systems – process from selection with PLC

Work study – significance – methods, evolution of normal/standard time – job design and rating

UNIT III: ELECTRONIC TESTING EQUIPMENTS

Multimeters – Oscilloscope – Digital Oscilloscope – Logic Analyser – Signature analyser – Signal generators – universal bridges – power supplies

UNIT IV: FUNDAMENTALS OF TROUBLESHOOTING PROCEDURES

Making of an Electronic Equipments – Reading drawings and diagrams – Equipment failures – Causes of Equipment failures – Nature of faults – Fault finding aids – Troubleshooting techniques – Approaching components for test – Grounding systems in Electronic equipment – Temperature- sensitive intermittent problems – Corrective actions.

UNIT V: QUALITY CONTROL AND WASTE MANAGEMENT IN INDUSTRY

Types of Quality control – steps in Quality control – objectives and benefits of Quality control – Seven steps for Quality control – causes of variation in Quality control – Statistical process control – Quality circle – TQM

Pollution control – Polluting agents – E-Waste management - Recycling of water – Recovery techniques – Air pollution – Environmental standards – Safety precautions for the personnel.

REFERENCE:

- Ebook for production and operation management – www.todaylibrary.com
- Production and Operation management – S.Anil Kumar & N.Suresh – New Age International Publication.
- PCB design , Fabrication, Assembly & Testing – Dr. Khandpur- Tata Mc Graw Hill