



**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 2021-2024 Onwards)

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

DDU KAUSHAL Kendra

For students admitted from the academic year 2020-2021 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.

PROGRAMME OUTCOMES:

The Department of Technology in Electrical and Electronic Devices provides the practical learning environment for the students which aim to meet out the industrial requirements in the field of Electrical and Electronics by providing more practical exposures and on job trainings.

The program Educational Objectives are as follows:

PO1: Provide graduates with the fundamental knowledge in science and mathematics required to understand the principles of Engineering.

PO2: Develop creative and innovative thinking ability of the students which are required for industry.

PO3: Create a technically skilled employee by imparting theoretical, practical and on job training to students.

PO4: Imparting the leadership qualities required for team work, production planning, decision making and industrial safety, so that they are work ready at exit point of the programme.

PO5: Create well disciplined and responsible citizens for the overall welfare of our nation.

PROGRAMME SPECIFIC OUTCOMES:

PSO1: Ability to apply the knowledge of basic Engineering principles in the field of Electrical and Electronics.

PSO2: Ability to design a system to meet out the desired needs of realistic constraints.

PSO3: Ability to troubleshoot and solve the problems in the area of Electronics.

PSO4: Ability to Coordinate with Multidisciplinary teams, allocate work and manage team to ensure that production deadlines and quality standards of an industry.

PSO5: Ability to use techniques, Skills and modern engineering tools required to develop new product with updated features and improved performance.

BASICS OF ELECTRICAL AND ELECTRONIC DEVICES

Course code	20KUT1C01	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.

Course Outcomes (CO)

CO1	Remembering the fundamentals of Electricity	K1
CO2	Understand the construction, characteristics and Application of DC Machines	K2
CO3	Understand the construction, characteristics and Application of AC Machines	K2
CO4	Understand and analyze the Characteristics and specification of Electronic Devices.	K2 &K4
CO5	Understand and analyze the construction and working of basic Electronic circuits.	K2 &K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M	S	M	S	L	L
CO2	S	S	S	M	M	S	M	S	L	L
CO3	S	S	S	M	M	S	M	S	L	L
CO4	S	S	S	M	M	S	M	S	L	L
CO5	S	S	S	M	M	S	M	S	L	L

S - Strong; M - Medium; L - Low

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

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

UNIT III: A.C.MACHINES AND TRANSFORMERS

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 operationNecessity of starters - DOL and star/delta, auto transformer -application.

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

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.ArumugamDr.N.Premkumaran Khanna Publishers, New Delhi-1979
- 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-1990
- Electronic Devices and Circuits - Salivahanan, N.Sureshkumar and A.Vallavaraj Tata McGraw Hill Publishing Company, New Delhi-1998
- Electrical Equipment Handbook: Troubleshooting & Maintenance, The Mc Graw-Hill, Company, Inc - 1996

SUPERVISE ASSEMBLY LINE ACTIVITIES

Course code	20KUT1C02	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

OBJECTIVES:

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

Course Outcomes (CO)

CO1	Understand the responsibilities of supervisor.	K2
CO2	Understand the skills required for the supervisor.	K2
CO3	Apply the Safety Guidelines for Handling Electronic Assemblies and to achieve productivity	K3
CO4	Apply safety procedures by understanding the importance of Electrical Safety.	K3
CO5	Understand and Analyze the importance of time management.	K2 &K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	M	L	L	S	M	L	S	M	S	S
CO2	S	M	M	S	S	L	S	S	S	S
CO3	S	M	S	S	S	M	S	M	S	M
CO4	S	M	S	S	S	M	S	M	S	M
CO5	M	M	L	S	S	L	S	L	S	S

S - Strong; M - Medium; L - Low

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 – Second edition
- Acceptability of. Assemblies – developed by IPC (IPC-A-610D)
- Successful Time management – www.bookboon.com

LINEAR INTEGRATED CIRCUITS

Course code	20KUT2C03	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

Course Outcomes (CO)

CO1	Understand the characteristics of Op-amp IC741	K2
CO2	Understand and analyze the applications of IC741	K2 &K3
CO3	Understand different types of A to D and D to A converters.	K2
CO4	Understand the characteristics and application of timer Ic's	K2& K3
CO5	Developing competencies to analyze Linear integrated circuits by understanding the fundamentals of OP-amp and Timer IC's.	K3 &K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S	S	M	M	L	L
CO2	S	S	M	M	S	S	M	S	L	L
CO3	S	S	M	M	S	S	M	M	L	L
CO4	S	S	M	M	S	S	S	S	L	L
CO5	S	S	S	M	S	S	S	S	L	L

S - Strong; M - Medium; L - Low

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, Monotonicity, 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.Roychoudhury&Shail.B. Jain - New age Int. Publishers - II Edition
- "Integrated circuits" - K.R. Botkar - Khanna Pulbisher's - 1996

DIGITAL ELECTRONICS

Course code	20KUT3C04	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

Course Outcomes (CO)

CO1	Understand various types of number systems, binary arithmetic and codes.	K2
CO2	Remembering truth table, symbol and equation of various logic gates	K1
CO3	Analyze combinational Logic circuits and sequential Logic circuits	K3
CO4	Understand the circuit and working of Registers and digital memories.	K2
CO5	Developing competencies to design Digital logic circuits by understanding the fundamentals of Logic gates and Flip flops.	K3 &K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	M	M	S	M	M	L	L
CO2	S	S	S	M	S	S	S	S	M	L
CO3	S	S	S	M	S	S	S	S	M	L
CO4	S	S	S	M	S	S	S	S	M	L
CO5	S	S	S	M	S	S	S	S	M	L

S - Strong; M - Medium; L - Low

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 using 1'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.

PRODUCTION PLANNING AND CONTROL

Course code	20KUT3C05	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	III

OBJECTIVES:

- To understand the concepts of Production and operation Management
- To understand Production and man power planning
- To understand the concept of Purchasing and inventory control

Course Outcomes (CO)

CO1	Understand the objectives of Production and operation managements systems.	K2
CO2	Originate a procurement chart based on production plan for future months	K2 &K3
CO3	Understand the importance of man power planning.	K2
CO4	Understand purchasing management and inventory control	K2
CO5	Analyze the production plan based on the product demand data.	K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	S	M	M	S	S	S
CO2	M	S	M	S	S	M	S	S	S	M
CO3	L	M	M	S	S	M	S	S	S	S
CO4	L	M	L	S	S	M	S	M	S	M
CO5	M	M	M	S	S	M	S	S	S	S

S - Strong; M - Medium; L - Low

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

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: PURCHASING MANAGEMENT

Introduction - Procurement process -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.

UNIT V: MAINTENANCE AND INVENTORY CONTROL

Introduction - objectives - types of maintenance - maintenance planning - Maintenance Scheduling - Maintenance schedule techniques - **Total Productive Maintenance.**
Meaning of Inventory - Reasons for keeping inventory - meaning & objectives of inventory control - **Benefits and techniques of inventory control** - inventory model.

REFERENCE:

- Production and Operations Management - Pannerselvam, PHI - Second edition
- Production and Operation management - S.Anil Kumar &N.Suresh - New Age International Publication- 2015
- 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
- Purchasing management - Lars Bedes, Sofia Eklund, Nojan Najafi- CHALMERS- Department of Technology Management and Economics

TECHNICAL DRAWING

Course code	20KUT4C06	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Objectives:

- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing national standards related to technical drawings.

Course Outcomes (CO)

CO1	Apply the Skill in the Geometric construction.	K3
CO2	Understand and Develop the Orthographic and Isometric projections.	K2 & K3
CO3	Remember the symbols widely used in Electrical and Electronics circuits.	K1

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	L	M	M	S	M	L	L
CO2	M	S	M	L	M	M	S	M	L	L
CO3	S	S	M	L	S	M	S	M	L	L

S - Strong; M - Medium; L - Low

Unit I - Geometrical construction

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

Unit II- Projections

Orthographic (first angle and third angle) (10 simple exercises each) - **Isometric** (5 simple exercises) - Oblique (2D and 3D wire frame models) (3 simple exercises) - Blue print reading (Missing views - Missing Lines - Missing dimensions)

Unit III- Sectional View

Types of sectional view (Full section, Half section, Aligned section, Offset Section, Revolved Section, Removed section) - Detailing view.

Unit IV -Electrical and Electronics Symbols

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 -

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

Unit V- 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- Simple sketches (lines and curves)

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.

Open Elective - I

1. Principles of management
2. Personality Development and Human Behaviour

Open Elective I- PRINCIPLES OF MANAGEMENT

Course code	20KUG4EA1	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Objectives:

- Study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

Course Outcomes (CO)

CO1	Understand the basic managerial functions of an organization	K1
CO2	Develop the leadership qualities and planning attitude	K2 &K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	L	L	L	S	M	L	M	M	S	S
CO2	M	M	M	S	M	L	S	S	S	S

S - Strong; M - Medium; L - Low

UNIT I: INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

Definition of Management - Science or Art - Manager - 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 - Current trends and issues in Management.

UNITII: PLANNING

Nature and purpose of planning - planning process - types of planning - objectives - setting objectives - policies - Planning Tools and Techniques - Decision making steps and process.

UNIT III: ORGANISING

Formal and informal organization - organization chart - organization structure - types - Line and staff authority - departmentalization - delegation of authority - centralization and decentralization - Human Resource Management - HR Planning, Recruitment, selection, Training and Development, Performance Management.

UNIT IV: DIRECTING

Meaning, Principles and Functions- 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** - 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.

Open Elective I - PERSONALITY DEVELOPMENT AND HUMAN BEHAVIOUR

Course code	20KUG4EB1	Credits	4	Year	III
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	VI

Objectives:

- To update the knowledge of schools of psychology and recent trends of psychology.
- To be familiarized with the developmental changes in various development stages across the life span.
- To equip the knowledge of personality, intelligence, motivation, perception, learning and attitude.
- To understand the importance of developmental stages of psychology and Health Psychology in social work practice and be able to know the real life situations.

Course Outcomes (CO)

CO1	Enhance the knowledge in the field of psychology.	K1 &K2
CO2	Importance of personality, intelligence, motivation, perception, learning and attitude in day to day life.	K2 &K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	L	L	L	S	M	L	S	M	S	S
CO2	L	L	L	S	M	L	S	M	S	S

S - Strong; M - Medium; L - Low

UNIT - I

Psychology: Definition - **Schools of Psychology:** Structuralism, Functionalism and Gestalt - **Recent trends:** Biological, Psychodynamics, Cognitive, Behavioural, Humanistic - Branches of psychology, Application of Psychology in Social Work.

UNIT - II

Evolution of human life: Conception - Stages of Prenatal development a) Period of Ovum, b) Period of embryo, c) Period of Fetus - Birth and its types - Pre and Post natal care -

Human growth and development: Developmental tasks, Hazardous, Physical, Social, Emotional and Cognitive development of Infancy, Babyhood, Childhood, Puberty, Adolescence, Adult, Middle age, Old age (Applicable wherever relevant).

UNIT - III

Personality: Definition and Characteristics - **Major approaches to personality:** Trait, Learning, Biological, Humanistic, Freudian and Neo Freudian - Assessment of personality - Influence of Heredity and Environment in one's personality development

Intelligence: Definition - **Theories of intelligence:** Unitary, Multi-factor, Two factor, Group factor, Hierarchical - Types of intelligence - Measurement of intelligence - Classification of I.Q - Mentally retarded - Gifted - **Motivation:** Definition, Human needs and motivation - Interaction of motivation - **Theories of motivation:** Instinct, Drive reduction, Arousal, Incentive, Cognitive, Maslow's Hierarchy.

UNIT - IV

Perception: Definition, Characteristics, Perceptual processes, Factors influencing perception, Depth perception and Motion perception, Perceptual illusion, Subliminal perception and Extra sensory perception - **Learning:** Concept and **types of learning:** Cognitive, Sensory, Motion and Verbal learning - **Theories:** Trial and error, Classical conditioning, Operant conditioning, Insightful - Transfer of learning - **Attitude:** Definition, Nature, Components of attitude and their Consistency, Prejudice, Process of attitude change.

UNIT - V

Health Psychology: Stress, Factors influencing stress, Stress reduction strategies (Coping, relaxation, Meditation, Group, Music, exercise and relationship therapies) - Defense mechanisms - A brief idea on major psychiatric illness - Significance of mental health - Role of social workers in promoting mental health.

REFERENCE:

1. Feldman Robert. S. (2006). *Introduction to Psychology*. New Delhi: Tata Mc Graw Hill.
2. Mangal. S.K. (2007). *General Psychology*. New Delhi: Sterling.
3. Pankajam. G. (2005). *Know your Child*. New Delhi: Concept.
4. Pathak Shalini. (2007). *Human Development*. New Delh:,Sonal.
5. Sharma. K.K. (2003). *Principles of Developmental Psychology*. Jaipur: Sublime.

PROGRAMMABLE LOGIC CONTROLLER

Course code	20KUT4C07	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	IV

OBJECTIVES:

- Understand the concept of PLC
- Understand the Ladder logic of PLC .
- Understand the PLC instruction
- Understand the application of PLC

Course Outcomes (CO)

CO1	Remembering general block diagram and connectivity of PLC	K1
CO2	Understand the various Classification PLC programming standards	K2
CO3	Understand input, output, timer and counter instructions	K2
CO4	Understand the Arithmetic and Logical Instructions	K2
CO5	Understand and Write the PLC Ladder logic program for various Applications.	K2 &K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	L	M	M	S	M	L	L
CO2	S	S	S	L	M	M	S	S	L	L
CO3	S	S	S	L	M	M	S	S	L	L
CO4	S	S	S	L	M	M	S	S	L	L
CO5	S	S	S	L	S	M	S	S	L	L

S - Strong; M - Medium; L - Low

UNIT I: INTRODUCTION TO PLC

Definition - Requirements of PLC - Advantages over relay logic - Block diagram - parts - operation - description & connectivity - communication - memory - PLC scanning - I/O interfacing.

UNIT II: PLC PROGRAMMING

Hand held programming terminals pcs & PLC programming - industrial computer - 1EC 1131 Programming standards - ladder diagram (LD) - functional block diagram (FBD) - instructional list structural text (ST) - sequential functional chart - Conventional wiring diagram versus PLC ladder logic - logic functions - AND logic, OR logic two input & three inputs with truth table - not logic exclusive OR logic combinational logic - priority logic elements.

UNIT III: PLC INSTRUCTIONS - I

Normally open (or) Examine ON - Normally closed (or) Examine OFF - one shot instruction - Latch output coil unlatch coil- ON delay timer instruction (TON) - OFF delay timer instruction (TOFF) - Retentive timer instruction (RTO) - Counter up instruction (CTU) - Counter down instruction (CTD) - Reset instruction (RES)

UNIT IV: PLC INSTRUCTIONS - II

Equal (EQU) - Not equal (NEQ) - Less than (LES) - Less than or equal (LEQ) - Greater than (GRT) - Greater than or equal (GEQ) - Masked comparison for equal (MEQ) - Limit test (LIM)

Add (ADD) - Subtract (SUB) - Multiply (MUL) - Divide (DIV) - Clear (CLR) - Square root (SQR) -AND - OR - EX-OR - NOT

UNIT V: APPLICATIONS OF PLC

Ladder logic diagram for DOL starter - star/Delta Starter - fluid filling operation - traffic light control -two speed motor control circuit using ladder logic - Automatic rotor resistance starter control using ladder logic.

REFERENCE:

- | | | | |
|---|---|------------------|---------------|
| Introduction to Programmable LogicController - Publications | - | Gary Dunning, | Delmar |
| Sensors and Communication | - | Jon Sterner son | |
| Programmable Logic Controllers | - | Peteruzella | |
| Programmable Logic Controllers | - | George L Batter, | Mc-Graw Hill |
| Programmable Logic Controllers | - | Colin D Simpson, | Prentice Hall |

Open Elective II- TOTAL QUALITY MANAGEMENT

Course code	20KUG5EA2	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

Objectives:

- To facilitate the understanding of **Quality Management principles and process.**

Course Outcomes (CO)

CO1	Gain the knowledge of Quality management principles and Techniques.	K1
CO2	Understand the importance of the Quality and apply in industry.	K2 &K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	L	M	L	S	S	L	M	M	S	S
CO2	L	M	L	S	S	L	M	M	S	S

S - Strong; M - Medium; L - Low

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- 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 - 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.Besterfield, et al., "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

Open Elective II- BUSINESS ORGANIZATION

Course code	20KUG5EB2	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

Objectives:

- To understand the different types of business organizations.
- To understand the process of formation of business organization.

Course Outcomes (CO)

CO1	Understand the concept of business.	K2
CO2	Gain knowledge to start and run a business effectively in the modern society.	K2 &K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	L	M	L	S	S	L	M	M	S	S
CO2	L	M	L	S	S	L	M	M	S	S

S - Strong; M - Medium; L - Low

Unit-I

Business: Concept- Objectives - Characteristics - Types and Qualities of a good Businessman.
Business Organization: Concept- Characteristics of an ideal form of Business organization.

Unit-II

Forms of Business Organisation : Sole Trader, Partnership, Joint Stock Companies, Cooperative Organisation and Public Utilities - Merits and Demerits - Memorandum of Association and Articles of Association.

Unit-III

Company **Management-Shareholders:** Powers, Duties, Responsibilities and Functions- Composition of Board- Board of Directors: Functions -Chief Executive-Managing Director- Legal Restrictions-Provisions in the Companies Act.

Unit-IV

Methods of raising funds: Need and importance of ST & LT finance - Issue of Shares, issue of Debentures- Public deposits - assistance from Govt. and Industrial Financial Institutions borrowings from banks

Unit-V

Rationalisation: Definition- Objectives - Measures -Advantages-Automation- Business Combination: Concept- objectives - Causes - Types - Forms.

Books Recommended:

1. Y.K. Bhushan, Fundamentals of Business organization and Management, Sultan Chand & Sons, 2012.
2. N.Vinayagam, A Text Book of Business Organisation. Emerald Publications. 2011.
3. P.N.Reddy&S.S.Gulshan, Principles of Business Organization and Management, Eurasia Publishing House Pvt. Ltd., 2009.
4. KathiresanRatha, Business Organisation- Prasanna Publications. 2006.

CORE VIII: ORGANIZATIONAL BEHAVIOUR

Course code	20KUT5C08	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

Objectives:

- To develop a sound theoretical knowledge and understanding of organizational behavior.
- To know how the people at work in an organization could be motivated to work together in harmony.
- To orient the student about leadership and perspective of organizational behavior.

Course Outcomes (CO)

CO1	Understand the values and importance to behave in an organization.	K2
CO2	Develop the skill of harmony to work together in the organization.	K2 & K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	L	L	L	S	M	L	M	L	S	S
CO2	L	L	L	S	M	L	M	L	S	S

S - Strong; M - Medium; L - Low

UNIT - I

Organizational Behavior: Concept, Historical background, Approaches and Models of OB - Challenges and Opportunities for OB -**Behavioral Science foundation:** Sociology, Psychology & Anthropology.

UNIT - II

Individual Dimension of OB: **Personality:** Self-esteem, Self-efficacy, perception, values - **Attitude:** Job satisfaction, job involvement, Organizational commitment - **Work Motivation:** Theories (Content, process) - **Job Design:** Job rotation, Job enlargement, Job enrichment- **Learning Theories:** Behaviorist, Cognitive and Social learning, Principles of learning - Punishment & Reinforcement.

UNIT - III

Dynamics of OB: Groups & Teams - Conflict & Negotiation - Stress & Stress management - **Leadership:** Types (Charismatic, Transformational and Substitute), Approaches (Managerial grid approaches, Likert's four system approaches), Skills - Emotional intelligence and managerial test.

UNIT - IV

Perspective of OB: Use and Types of Information Technology in Communication (MIS, Telecommunication, E-mail & Voice messaging) - **Non Verbal Communication:** Body Language & Paralanguage - **Decision making:** Group decision making, Delphi technique, Nominal group technique - Organizational Design - **Organizational culture and climate:** Definition and Characteristics.

UNIT - V

Organizational Change and Development: Change: Concept, Planned change, Resistance to change, Merges and Acquisitions - **Analysis:** Tools, techniques - **Development:** Concept, ESOP (Employee Stock Ownership Plan), Downsizing, Smart sizing

Reference:

1. Amrik Singh Sudan & Kumar N. (2003). *Management Process and OB*. Delhi: Anmol Publications.
2. Don Hellriegel, John (etall). (1995). *Organizational Behaviour*. New York: West Publishing Company.
3. Jit S. Chandan. (1999). *Organisational Behaviour*. N. D: Vikas Publishing House.
4. Mishra M.N. (2001). *Organizational Behaviour*. Mumbai: vikas.

MICROPROCESSOR AND MICROCONTROLLER

Course code	20KUT5C09	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

Course Outcomes (CO)

CO1	Understand the architecture, addressing modes and instructions of 8085 Microprocessor.	K2
CO2	Understand the architecture, pin diagram of 8051 Microprocessor.	K2
CO3	Understand Addressing Modes, Data transfer and Logical instruction of 8051 Microcontroller	K2
CO4	Understand Arithmetic and Branching instruction of 8051 Microcontroller	K2
CO5	Analyse various interfacing application of 8051 Microcontroller.	K3 &K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	L	S	S	S	S	L	L
CO2	S	S	S	L	S	S	S	S	L	L
CO3	S	S	S	L	S	S	S	S	L	L
CO4	S	S	S	L	S	S	S	S	L	L
CO5	S	S	S	L	S	S	S	S	L	L

S - Strong; M - Medium; L - Low

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: 8051 MICROCONTROLLER

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-2nd edition
2. Microprocessors and Microcontrollers - M.Senthil Kumar, M.Saravanan, S.Jeevananthan - 2010
3. *8051 Architecture and Programming* - Kenneth Ayala- 1996

DEVELOP HARDWARE PRODUCT FOR MANUFACTURING

Course code	20KUT5C10	Credits	04	Year	III
No. of Lecture	60	No. of Practical	--	Sem	V

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

Course Outcomes (CO)

CO1	Identify Material requirement and selection of supplier	K1 &K2
CO2	Understand various planning and work study	K2
CO3	Recognize the requirements for developing the hardware product	K2 &K3
CO4	Understand the basic troubleshooting procedure in Electronic Equipments	K2
CO5	Analyze Quality control and waste management	K3 &K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	M	L	M	M	S	S
CO2	M	M	M	S	M	L	M	M	S	S
CO3	S	S	S	L	S	S	S	S	L	L
CO4	S	S	S	L	S	S	S	S	L	L
CO5	S	M	M	S	S	M	S	S	S	S

S - Strong; M - Medium; L - Low

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 - 2015
- PCB design , Fabrication, Assembly & Testing - Dr. Khandpur- Tata Mc Graw Hill - 2005

Open Elective III - PROFESSIONAL ETHICS AND HUMAN VALUES

Course code	20KUG6EA3	Credits	4	Year	III
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	VI

Objectives:

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

Course Outcomes (CO)

CO1	Create awareness of Ethics and moral values.	K1 &K2
CO2	Understand the importance of Ethics and code of conduct in business.	K2 &K3
CO3	Understand social responsibility in business and importance of human values	K2 &K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	L	L	L	S	M	L	L	L	S	S
CO2	L	L	L	S	M	L	L	L	S	S
CO3	L	L	L	S	M	L	L	L	S	S

S - Strong; M - Medium; L - Low

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:

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

SAFETY ENGINEERING

Course code	20KUT6C11	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Objectives:

- To follow **standard safety rules and concepts.**
- To understand the Safety procedures in material handling.
- To understand the Road and Electrical Safety.

Course Outcomes (CO)

CO1	Understand the importance of safety.	K2
CO2	Able to handle the materials and tools safely.	K2 &K3
CO3	Follow the road and electrical safety.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	M	M	M	M	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S

S - Strong; M - Medium; L - Low

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 Shop floor 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.RayAsfahl ,*Industrial Safety and Health management*, Pearson Prentice Hall,2003.
2. N.V Krishnan. *Safety Management in Industry* Jaico Publishing House, Bombay, 1997.

Open Elective IV - ENTREPRENEURSHIP DEVELOPMENT

Course code	20KUG6EA4	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Objectives:

- To understand the concept of Entrepreneur and entrepreneurship.
- To gain the knowledge about financial institutions.
- To understand the institutional setup, incentives and subsidies.
- To evaluate business ideas and to prepare the project report.

Course Outcomes (CO)

CO1	Understand concept of finance institutions, project report, incentives and subsidies.	K2
CO2	Develop the qualities to become an entrepreneur	K2 &K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	M	M	L	S	M	L	M	M	S	S
CO2	M	M	M	S	M	L	M	M	S	S

S - Strong; M - Medium; L - Low

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 – Kadi 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. KhakaSS, 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.

Open Elective IV -HUMAN RESOURCE MANAGEMENT

Course code	20KUG6EB4	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Objectives:

- To achieve a sound theoretical understanding about Human Resource Management.
- To develop knowledge and skill in handling Human Resource in an organization.
- To orient the student about the social compliance & Social Audit followed by an organization.
- To acquaint the student with the goals of the organization

Course Outcomes (CO)

CO1	Basic understanding and gain knowledge about the role and responsibilities of HR Manager.	K2
CO2	Develop the problem solving attitude.	K2 &K3
CO3	Develop the qualities to become an HR manager.	K2 &K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	L	L	L	S	M	L	M	M	S	S
CO2	L	L	M	S	M	L	S	M	S	S
CO3	L	L	M	S	M	L	S	M	S	S

S - Strong; M - Medium; L - Low

UNIT - I: Introduction to Human Resource Management:

Human Resource Management: Definition, Objectives, Importance and Functions (An overview of Operative and Managerial) - **HRM Models:** Rational model, Social system model, Human resource development model - **Human Resource Policies:** Meaning, importance, types and formulation - Role of human resource manager.

UNIT - II: Acquiring Human Resources:

Human Resource Planning: Definition, Need, Process - **Job analysis:** Job Description, Job specification - **Recruitment:** Meaning, Sources of Recruitment (internal and external) - e recruitment - Recent trends in Recruitment - **Selection:** Meaning and Steps - Placement and Induction.

UNIT - III: Developing Human Resources:

Employee Training: Meaning, Objectives, Importance, Types, Methods, Needs for Training and Evaluation of Training effectiveness - **Human Resource Development:** Concept, Need, Interventions - **Performance Appraisal:** Objectives, Uses and **Methods:** Traditional and Modern methods (720 Degree performance appraisal system), Barriers of performance appraisal - Career planning, Succession planning and Competency map.

UNIT - IV: Compensation, Retaining and Controlling of Human Resource:

Wage and Salary Administration: Concept and Methods of Wages - Theories - Incentives - Job evaluation - Employee Benefits and Services. **Retaining of Human Resource:** Promotion: Meaning, purpose, types - Demotion - Transfer - Separation. **Controlling of Human Resource:** Human Resource Records: Meaning, objectives, importance, types and Principles of Record Keeping - Human Resource Reports - Human Resource Audit : Meaning, objectives, importance and scope - Human Resource Research: Meaning, objectives and techniques.

UNIT - V: Strategy of quality management:

Social Compliance: Definition, Meaning and Significance - **Social Compliance Audit:** Purpose, Obligations of employers, Audit process - **Social Compliance Standard:** SA 8000 (Social Accountability 8000) - **Social Compliance Training:** GSCP (Global Social Compliance Programme) - **Social Compliance Certification:** Principles, Significance of WRAP (Worldwide Responsible Accredited Production).

Strategy of quality management: Six Sigma, Keizen, TQM, TPM, QMS - ISO Systems, ISO Certification Schemes, **ISO types:** ISO 9001, 14001, ISO/TS 16949- **Preparing an Organization for ISO Certification** - **Quality assurance:** Mckinesey's 7s frame work, HR out sourcing - People Capacity Maturity Model (PCMM).

REFERENCE

1. Ahuja. (2002). *Personnel Management*. Luthian: Kalyani Publishing.
2. BiswajeetPattanayak. (2001). *Human Resource Management*. New Delhi: Prentice Hall of India Private Ltd.
3. Decenzo and Robbins. (2001). *Personnel/Human Resource Management*. New Delhi: Prentice Hall.
4. Jayagopal R. (1992). *HRD Conceptual Analysis and Strategies*. New Delhi: Sterling.
5. Lynton and Pareek. (1990). *Training for Development*. New Delhi: Vistar.