



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) Production Technology (Tool & Die)**
(An IIC sponsored DDU KAUSHAL KENDRA Programme)

SYLLABUS

(ACADEMIC YEAR 2018-2019 Onwards)

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

B.VOC (Production Technology (Tool & Die))

For Students admitted from 2018-2019 & onwards

COURSE OF STUDY

- Syllabus is framed for B.VOC (Production Technology (Tool & Die)) 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 Production Technology (Tool & Die) provides the practical learning environment for the students which aim to meet out the industrial requirements in the field of Production and Manufacturing 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 tool and die making.

PSO2: An ability to use the techniques, skills and modern engineering tools.

PSO3: An ability to design a system, component or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

PSO4: An ability to function on multidisciplinary teams.

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

PLANNING AND FITTING

Course code	18KUP1C01	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

Course Outcomes (CO)

CO1	Student will be able to do any type of fitting without any error.	K,U&S
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K-Knowledge U- Understand S-Skill

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

S - Strong; M - Medium; L - Low

LATHE

Course code	18KUP1C02	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

Course Outcomes (CO)

CO1	Student will be able to operate a lathe to produce any component.	K,U&S
CO2	Student will be able to work safely in a workshop.	U&S

K-Knowledge

U- Understand

S-Skill

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

S - Strong; M - Medium; L - Low

SPECIAL MACHINES

Course code	18KUP2C03	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

Course Outcomes (CO)

CO1	Student will be able to operate all the special machines used in production.	K,U&S
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K-Knowledge U- Understand S-Skill

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

S - Strong; M - Medium; L - Low

CNC MACHINES AND EDM

Course code	18KUP3C04	Credits	05	Year	II
No. of Lecture Hours	75	No. of Practical Hours	--	Sem	III

Course Outcomes (CO)

CO1	Student will be able to operate CNC machines and EDM	K,U&S
CO2	Student will able to write a part program for any component and setting up in machines.	K,U&S

K-Knowledge

U- Understand

S-Skill

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

S - Strong; M - Medium; L - Low

TECHNICAL DRAWING

Subject code	18KUG4AL4	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Course Outcomes (CO)

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

K- Knowledge, U - Understand, S - Skill

	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

PRINCIPLES OF MANAGEMENT

Subject code	18KUG4EL1	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

Course Outcomes (CO)

CO1	Understand the basic managerial functions of an organization	U
CO2	Develop the leadership qualities and planning attitude	K & U

K- Knowledge, U - Understand, S- Skill

	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

DRAFTING AND PLOTTING

Course code	18KUP4C05	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	IV

Course Outcomes (CO)

CO1	Student will be able to create and edit the design.	K,U&S
CO2	Student will be able to modify the designs as per the requirement.	K,U&S

K-Knowledge

U- Understand

S-Skill

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

S - Strong; M - Medium; L - Low

Total Quality Management

Subject code	18KUG5EL2	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

Course Outcomes (CO)

CO1	Gain the knowledge of Quality management principles and Techniques.	K
CO2	Understand the importance of the Quality and apply in industry.	U & S

K- Knowledge, U - Understand, S - Skill

	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

DESIGN OF JIGS AND FIXTURES

Course code		18KUP5C06	Credits	04	Year	III
No. of Lecture Hours		60	No. of Practical Hours	--	Sem	V

Course Outcomes (CO)

CO1	Student will be able to design and manufacture jigs and fixtures for the requirement	K,U&S
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K-Knowledge

U- Understand

S-Skill

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

S - Strong; M - Medium; L - Low

PROFESSIONAL ETHICS AND HUMAN VALUES

Subject code	18KUG6EL4	Credits	4	Year	III
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	VI

Course Outcomes (CO)

CO1	Create awareness of Ethics and moral values.	K & U
CO2	Understand the importance of Ethics and code of conduct in business.	K & U
CO3	Understand social responsibility in business and importance of human values	U & S

K- Knowledge, U - Understand, S - Skill

	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

Safety Engineering

Subject code	18KUG6EL5	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Course Outcomes (CO)

CO1	Understand the importance of safety.	U
CO2	Able to handle the materials and tools safely.	K,U& S
CO3	Follow the road and electrical safety.	U & S

K- Knowledge, U - Understand, S- Skill

	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

Entrepreneurship Development

Subject code	18KUG6EL6	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	VI

Course Outcomes (CO)

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

K- Knowledge, U - Understand, S - Skill

	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

PLANNING AND FITTING

Subject code	18KUP1C01	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

UNIT – I

Working safety – Health and safety – environmental and operating conditions – Safety considerations – Personal protective equipment (PPE) – Safety regulations – Tools and equipments – Hand tools – Machine tools – Inspection.

UNIT – II

Obtaining and understanding drawings – Tools and dies – Engineering information – Company procedures – Analyze design drawings – Knowledge of available resources – Sequencing / Process planning – Reporting – Specifications – Computing – Production planning

UNIT – III

Various operations – Tool selection – Material selection – Tool life – Factors affecting tool life – Types of equipments – Time estimation – Sequence analysis – Milestones – Approval - Responsibility – Allocation of responsibility – ensure and inspect – Release drawings, machining specifications, process planning, production planning to operators – Selection of tools – Selection of equipments – Selection of materials.

UNIT – IV

Fitting – Types of fitting – Procedures and instructions – Fitting tools – Equipments – Job specification – Requirements – Reporting – Preparation of work area – Measuring instruments – Calibration – Selection of raw materials – Inspection - Selection of tools and equipments – Work holding devices – Supporting mechanisms – Marking – Templates – Transfer / Trace – Hand tools and manually operated machine tools for fitting – Assembling – Inspection.

UNIT – V

Quality – Measurement – Types of measurement – Visual inspection – Standards – Target – Risk of failure – Conditions – Reporting – Time estimation – Production target and specifications – Inspect and check – Documentation.

Equipments – Types – Error – Calibration – Tool components – Tool clamping – Various operations – Drilling, Reaming, Boring, Tapping – Assembling equipments – Fasteners – Adhesives – Soldering – Brazing – Dismantling and assembling – Problem solving – Tool and die – Measure – Inspect – Procedure.

REFERENCE:

- Fitting and machining by Ron Culley published by TAFE Publications.
- Mechanical Technology Grade 10: Fitting and machining learner book by D Meyer and BH Van Der Westhuizen.
- Fitter trade theory by Balbir Singh.

LATHE

Subject code	18KUP1C02	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

UNIT – I

Working safety – Environmental conditions – Operating conditions – Personal protective equipment (PPE) – Procedures and guidelines – Health and safety – Safety regulations – Safety instructions.

UNIT – II

Measuring instruments – Types – Error – Calibration – Range – Selection – Materials – Types – Selection – Requirements – Specification – Raw materials – Work area – Process planning.

UNIT – III

Turning – Turning tools – Selection – Types – Properties – Tool materials – Safe working practices – Machine inspection – Work holding devices – types – Tool holding devices.

UNIT –IV

Turning machine – Types – Main parts – Specification – Turret and capstan lathe – Turret indexing mechanism – Driving mechanisms – Various operations – Various attachments – Taper turning – Various methods – Thread cutting – Special attachments – Speed – Feed – Depth of cut.

UNIT – V

Mounting of tools – Work piece – Operating procedures – Modes of control – Usage of Lathe parts – Various methods in clamping work piece – Various equipments used – Backlash – Effects of backlash – Accuracy – Dimensional accuracy – Tool life – Factors affecting tool life – Cutting fluids – Types – Properties – Selection – In-process inspection – Quality control procedures.

REFERENCE:

- The Lathe book : A complete guide to the machine and its accessories by Ernie Conover
- The metal Lathe by David J Gingery

SPECIAL MACHINES

Subject code	18KUP2C03	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

UNIT - I

Milling – Types of milling – Milling machine – Types – Constructional features – Main parts – Working principle – Inspection of machine – Training – Safety – Tools and equipments – Cutters – Types – Work holding devices – Cutter holding devices – Flexibility of machine – Component drawings – Specifications – Extraction – Various milling machines – Various operations – Hand mode – Power mode – Emerging situations – Safety

UNIT - II

Measurements – System of measurement – Imperial system – Metric system – Quality standards – Production targets – Backlash – Tool life – Surface finish – Accuracy – Cutting fluids – Properties – Types – Quality control procedures – Inspecting equipments – Inspection – Hazards – Equipments – Working tools – Measurements – Measuring instruments – Calibration – Least count – Error – Types – Work holding devices – Clamping – Material selection – Equipment selection.

UNIT - III

Grinding – Types – Grinding machine – Types – Constructional features – Working principle – Grinding wheel – Designation – Preparation – Abrasives and types – Bonding – Materials – Preparation – Types – Various operations – Mounting of grinding wheels – Steps in mounting – Safety considerations – Speed – Feed – Depth of cut – Surface finish – Factors affecting – Coolants – Types – Properties – Selection – Measurement – Measuring instruments – Calibration – Inspection.

UNIT – IV

Work holding devices – Selection – Set – Mark – Prepare the work – Selection of tool – Stone – Wheel – File – Abrasives – Specification of grinding wheel – Factors considered for selection – Bond – Types – Wheel types – Cut-off discs (Diamond blade) – Abrasive grinding discs – Grinding stones – Wire brush wheels

UNIT - V

Control setting – Work handling – Grinding machine – Types – Angle grinders – Bench grinders – Straight grinders – Rotary die grinders – Disc grinder – Electronic grinder – Electric grinder – Hydraulic grinder – Pneumatic grinder – Pedestal grinder – Cylindrical grinder – Inspection – Surface finish – Geometric dimensions – Dressing and truing of wheels – Cutter – Diamond cutter – Common surface imperfections – Errors – Texture – Roughness – Secure tools and equipments – Repairing – Maintenance – Types – Documentation – Job card – Progress reports – Incident reports – Support – Monitor.

REFERENCE:

- Machinist handbook for the apprentice by David B Smith
- Fundamentals of Machining processes : Conventional and Nonconventional Processes by Hassan Abdel - Gawad Ei-Hofy.

CNC MACHINES AND EDM

Subject code	18KUP3C04	Credits	05	Year	II
No. of Lecture Hours	75	No. of Practical Hours	--	Sem	III

Unit-I

Working Safety - Personal Protective equipment - Hand tools - Cutting tools - Cutting tools materials - Measuring equipments. Preparing for machining activities on Turning Center - Valid sources - Job Specification documents- Job requirements.

Information pertaining to tapping sizes and thread, feed and speeds, machining symbol and tolerance - Preliminary check - Cutting tools- reference charts - Tables and Graphs - Preliminary check - Description of Turning machine specification.

Critical Parameters- Tooling data - Features of machined components produced work holding device and fixtures- Basic maintenance activities - features and profiles - Symbols used in program - Address characters function - G codes and M codes- identify different parts of the CNC turning machine -perform various turning operations to produce various features on metal and non-metal components.

Unit-II

Turning operations : straight turning, taper turning, facing, grooving, parting off, thread cutting, drilling, reaming, boring, etc.,

Milling operations: e.g. milling of flat surfaces; gang and straddle milling; milling of sunk and recessed surfaces, face milling, side milling, angular milling, slotting, slitting, key way cutting, face slot cutting, woodruff cutting, dovetail cutting, etc.

CNC machines - 2 axis CNC m/c - 3 axis m/c centre (VMC,HMC) terms in programming - Checks - CNC Programming operation - Preparing, Loading, storing in appropriate format providing part program, trial runs - Simulation [Command and format] - Reference position - Cutter radius offset - Tool length offset] - Cutter compensation function.

Unit-III

Engineering drawing-Dimensioning and labeling - Projection - Isometric Projection Part - Programme for relative work - Tool movement of a CNC m/c tool - Co-ordinate positioning (Absolute, Incremental), use of sub routines, macros and canned cycles-Cad/Cam CNC Program -Tool material design.

Tooling and work holding devices - Carry out setting for CNC turning center - Set up of machine - Perform the necessary checks before allowing the machine to operation in full program run mode - Checks - Measure all dimension as per specification - Basic maintenance activities.

Unit-III

Introduction to Unconventional machining processes - Types of Unconventional machining processes - Measuring equipments. Preparing for machining activities - Valid sources - Job Specification documents- Job

requirements. EDM-Spark erosion-Preliminary check e.g. Machine condition, position and alignment of work piece, lubricating systems, coolant level-sub-systems working condition, etc.,-Accuracy standards-free from damage-false tool cuts-burrs-scratches and non-specified sharp edges-general dimensional tolerance +/- 0.02mm-flatness and squareness 0.05mm-angles within +/-1 degree-setting of machine to achieve target

Unit-IV

Measuring and machining tools-Positioning and holding devices-Mechanical properties of metals-Features of finished components-Dimensional parameters-Accuracy parameters. Preparation of EDM for production-mount and setting of work holding devices-cutting tools-positioning of work piece-selecting and mounting of electrodes-setting machine tool operating parameters. Specification of EDM-electrical conditions-alignment of electrodes-filtration equipment-liner feeds and speeds-dielectric flow rates-ventilation and fume extraction-safety mechanisms/devices-maximum weight carrying capacity

Unit-V

Range of materials : ferrous e.g. low, medium and high carbon steels, low alloy steels, stainless steels, cast iron- nonferrous e.g Aluminium and its alloys, bronze, silicon carbide-Trial run-adjustment of parameters-positioning-hand over-instructions and documentation-completion of documentation-Switching on/off EDM-returning tools, equipments and instruments to store-changing of cutting tools-Documentation : job card-progress records-incident reports-problem solving-guidance-leaving work area.

REFERENCE:

- CNC Machines by B.S.Pabla and M.Adithan : New age international publishers
- CNC Programming handbook by Peter Smid
- EDM handbook by E.Bud Guitrau
- Electrical Discharge Machining by Dr M P Jahan

TECHNICAL DRAWING

Subject code	18KUG4AL4	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

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 -Involute - 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.

PRINCIPLES OF MANAGEMENT

Subject code	18KUG4EL1	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	IV

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.

DRAFTING AND PLOTTING

Subject code	18KUP4C05	Credits	05	Year	II
No. of Lecture Hours	75	No. of Practical Hours	--	Sem	IV

UNIT - I : BASICS OF CAD

Intro of CAD - CAD Workspaces - Using The Application Menu, Ribbon And The QAT- Command Line, Dynamic Input And Auto Complete- Toolbars, File Tabs And The Menubar- Pallets And Short Cut Menus-Using Function Keys And Command Aliases- The Status Bar- An Introduction To Model Space And Paper Space- Quick Access the Drawings

UNIT - II : FUNDAMENTAL OPERATIONS

Start and Quitting CAD-Object Selection Methods, Undo Command- Working With Specific Units- Working With The Coordinate System- Using The Grid System With The Snap Feature- Pan , Zoom, Osnap,Ortho and Grips- Project related to until this Chapter

UNIT – III : DRAWING,DRAFTING, EDITING AND TRANSFORMING TOOLS

Lines, Polylines And Their Uses-Arcs, Circles and its types-Points And Their Styles- Polygons , Rectangles And Ellipses- Methods To Create Precise Objects- Project related to until this Chapter

Trim And Extend Lines- Delete, Trim And Extend Lines- The Move And Copy Commands- Stretching, Rotating and Scaling Objects- Offset and Mirror- Fillet And Chamfer- Types of Arrays and Object Properties- Project related to until this Chapter

UNIT – IV : LAYERS AND ANNOTATIONS

Creating And Editing Layers- Layer Properties and Manager- Freeze, Thaw, On, Off, And Lock

Dimensions and its Styles- Dimensioning Tools And Settings- Multileaders- Single and Multiline Text- Text Styles and Tables- Chapter Project

UNIT – V : BLOCKS, PLOT AND PUBLISH

Intro about Blocks and its uses- Creating Blocks and Editing Blocks- Inserting Blocks And Using Them- Attributed and Dynamic Blocks- The Effect Of Exploding Blocks- Chapter Project

The Difference between Model Space And Paper Space-Viewports , Page Setup and Plotting- Export Your File

REFERENCE:

- A text book of Engineering drawing by Roop Lal and Ramakant Rana
- Engineering graphics with Autocad by D.M.Kulkarni, A.P.Rastogi, A.K.Sarka

Total Quality Management

Subject code	18KUG5EL2	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- 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

DESIGN OF JIGS AND FIXTURES

Subject code	18KUP5C06	Credits	05	Year	III
No. of Lecture Hours	75	No. of Practical Hours	--	Sem	V

Unit-I

Organization's policies and procedures for creating mechanical designs - roles and responsibilities of a designer - Microsoft office tools - presentation of designs - Sources of information and methodologies available - accessing - applied mechanics in practice - different types of simple mechanical designs and its uses - constraints - impact of constraints in mechanical designs - importance of design materials.

Creation of detailed drawings - Preparation of Bill of Materials (BOM) - Documents - knowledge sharing - creating documents for knowledge sharing - Organization's policies, procedures and guidelines for knowledge sharing - purpose and scope of knowledge sharing.

Unit-II

Team working - methods and techniques used in team working - tools, templates and language standards - document preparation tools - word, excel, power point - uses of document preparation tools - Organization's policies, procedures and priorities for your area of work - roles and responsibilities to carry out the work - Specific work requirements - Accuracy - importance of completing work accurately - procedure for accurate working - timescales.

Unit-III

Organization's procedures, guidelines for providing data/information - role and responsibilities in providing data/information - knowledge management culture - organization's policies and procedures for recording and sharing information - importance of complying the information - techniques used to obtain data/information - role based analysis - typical anomalies occur in data/information - reporting of inaccurate data/information

Unit-IV

Tool design objectives - Production devices - Inspection devices - Materials used in Jigs and Fixtures - Types of Jigs - Types of Fixtures-Mechanical actuation-pneumatic and hydraulic actuation-Analysis of clamping force-Tolerance and error analysis.

Drill bushes -different types of jigs-plate latch, channel, box, post, angle plate, angular post, turnover, pot jigs-Automatic drill jigs-Rack and pinion operated. Air operated Jigs components. Design and development of Jigs for given components. General principles of boring, lathe, milling and broaching fixtures- Grinding, planning and shaping fixtures, assembly, Inspection and welding fixtures- Modular fixtures. Design and development of fixtures for given component.

Unit-V

Press working terminology-Presses and press accessories-Computation of capacities and tonnage requirements. Elements of progressive combination and compound dies:Die block-

die shoe. Bolster plate-punch plate-punch holder-guide pins and bushes - strippers - knockouts-stops -pilots-Selection of standard die sets strip lay out-strip lay out calculations.

Design and development of progressive and compound dies for Blanking and piercing operations. Bending dies - development of bending dies-forming and drawing dies-Development of drawing dies. Design considerations in forging, extrusion, casting and plastic dies.

(Use of approved design data book is permitted)

TEXT BOOKS

1. Edward G Hoffman, Jigs & Fixture Design, Thomson - Delmar Learning, Singapore 2004
2. Donaldson. C, Tool Design, Tata McGraw-Hill, 1986

REFERENCES

1. Kempster, "Jigs & Fixtures Design, The English Language Book Society", 1978
2. Joshi, P.H., "Jigs & Fixtures, Second Edition", Tata McGraw-Hill Publishing Company Limited, New Delhi 2004
3. Hiram E Grant, ' Jigs and Fixture' Tata McGraw-Hill, New Delhi, 2003
3. Fundamentals of Tool Design, CEEE Edition, ASTME, 1983
4. PSG College of Technology, Coimbatore - Design Data Handbook.

PROFESSIONAL ETHICS AND HUMAN VALUES

Subject code	18KUG6EL4	Credits	4	Year	III
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	VI

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

SAFETY ENGINEERING

Subject code	18KUG6EL5	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, planing 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

Subject code	18KUG6EL6	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.