



**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 UGC sponsored DDU-KAUSHAL KENDRA Programme)**

SYLLABUS

(ACADEMIC YEAR 2019-2020 Onwards)

Sri Ramakrishna Mission Vidyalaya College of Arts and Science
Production Technology (Tool & Die)

For Students admitted from 2019-2020 & onwards

COURSE OF STUDY

- Syllabus is framed for B.VOC in 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 Educational Objectives

The Department of Production Technology (Tool & Die) provides the best learning resources for the students which aimed at bridging the gap of industry requirement in the field of production and maintenance of tool and die by providing earn while you learn facility and OJT's.

The program educational outcomes are given below:

PEO1: Making students knowledgeable in basic science, mathematics and basic machining operations.

PEO2: Imparting analytic skills to develop initiatives and innovative ideas for industrial as well as societal needs.

PEO3: Providing students the required theoretical and practical knowledge in the field of tool and die making.

PEO4: Imparting the qualities of team work as well as social, interpersonal and leadership skills and an ability to adapt professional environment.

PEO5: Evaluating that the students have adequate knowledge and skills, so that they are work ready at exit point of the programme.

Programme Outcomes:

- Ability to apply the knowledge of basic engineering principles in tool and die making.
- Ability to analyze and solve the problems.
- An ability to use the techniques, skills and modern engineering tools.
- 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.
- An ability to function on multidisciplinary teams.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- Recognition of need for, and an ability to engage in life-long learning.

SCHEME OF EXAMINATION

SEMESTER - I

Course Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
18KUG1TA1	I	Tamil I	60	-	2	50	50	100	4
18KUG1EN1	II	Basic English	60	-	2	50	50	100	4
18KUG1AL1	III	Allied I: Mathematics- I	60	-	2	50	50	100	4
Sub Total (A)			180	-	06	150	150	300	12
VOCATIONAL EDUCATION COMPONENT									
19KUP1C01	III	Core I: Basics of Production	60	-	2	50	50	100	4
19KUP1C02	III	Core II: Production Technology - I	60	-	2	50	50	100	4
Sub Total (B)			120	-	04	100	100	200	08
Total (A +B)			300	-	10	250	250	500	20

SEMESTER - II

Course Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
18KUG2TA2	I	Tamil II	60	-	2	50	50	100	4
18KUG2EN2	II	Professional English	60	-	2	50	50	100	4
18KUG2AL2	III	Allied II: Office Automation	60	-	2	50	50	100	4
Sub Total (A)			180	-	06	150	150	300	12
VOCATIONAL EDUCATION COMPONENT									
19KUP2C03	III	Core III: Production Technology - II	60	-	2	50	50	100	4
19KUPT2P1	III	Practical I: Production Technology - I	-	60	3	50	50	100	2
18KUPT2P2	III	Practical II: Production Technology - II	-	60	3	50	50	100	2
18KUPT2I1	III	Internship Training-I		1200	3	100	300	400	20
Sub Total (B)			60	1320	11	250	450	700	28
Total (A +B)			240	1320	17	4000	600	1000	40

SEMESTER - III

Course Code	part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
18KUG3EN3	II	Technical Communication	60	-	2	50	50	100	4
18KUG3AL3	III	Allied III: Mathematics-II	60	-	2	50	50	100	4
18KUG3ENS	IV	Environmental studies	60	-	2	50	50	100	4
Sub Total (A)			180	-	06	150	150	300	12
VOCATIONAL EDUCATION COMPONENT									
19KUP3C04	III	Core IV: Advanced Production Technology	60	-	2	50	50	100	4
19KUPT3P3	III	Practical III: Advanced Production Technology	-	60	3	50	50	100	3
Sub Total (B)			60	60	05	100	100	200	06
Total (A +B)			240	60	11	250	250	500	18

SEMESTER - IV

Course Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
18KUG4AL4	III	Allied IV: Technical Drawing	60	-	2	50	50	100	4
18KUG4EL1	III	Elective I: Principles of Management	60	-	2	50	50	100	4
18KUG4VAD	IV	Value Education	60	-	2	50	50	100	4
Sub Total (A)			180	-	06	150	150	300	12
VOCATIONAL EDUCATION COMPONENT									
18KUP4C05	III	Core V: Drafting and Plotting	60	-	2	50	50	100	4
18KUPT4P4	III	Practical IV: Drafting and Plotting	-	60	3	50	50	100	3
18KUPT4I2	III	Internship Training-II	-	1200	3	100	300	400	20
Sub Total (B)			60	1260	8	200	400	600	26
Total (A +B)			240	1260	14	350	550	900	38

SEMESTER - V

Course Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal	External		
GENERAL EDUCATION COMPONENT									
18KUG5EL2	II	Elective II: Total Quality Management	60	-	2	50	50	100	4
18KUG5AL5	III	Allied V: Mathematics -III	60	-	2	50	50	100	4
18KUG5EL3	III	Elective III: Indian Values	60	-	2	50	50	100	4
Sub Total (A)			180	-	06	150	150	300	12
VOCATIONAL EDUCATION COMPONENT									
19KUP5C06	III	Core VI: Tool Design - I	75	-	2	50	50	100	5
18KUPT5P5	III	Practical V: Design and Manufacturing	-	60	3	50	50	100	3
18KUPT6PR	III	Project	-	75	-	-	-	-	-
Sub Total (B)			75	135	05	100	100	200	07
Total (A +B)			255	135	11	250	250	500	19

SEMESTER - VI

Course Code	Part	Name of the Subject	Lecture / Practical Hrs		Duration of Exam in Hours	Marks		Total Marks	Credits
			Lecture	Practical / Field Work		Internal/Theory	External/Practical		
GENERAL EDUCATION COMPONENT									
18KUG6EL4	III	Elective IV: Professional Ethics and Human Values	60	-	2	50	50	100	4
18KUG6EL5	III	Elective V: Safety Engineering	60	-	2	50	50	100	4
18KUG6EL6	III	Elective VI: Entrepreneurship	60	-	2	50	50	100	4
Sub Total (A)			180	-	06	150	150	300	12
VOCATIONAL EDUCATION COMPONENT									
19KUP6C07	III	Core VII: Tool Design - II	75	-	2	50	50	100	5
18KUPT6PR	III	Project	-	165	3	50	50	100	5
18KUPT6I3	III	Internship Training-III	-	1200	3	100	300	400	20
Sub Total (B)			75	1365	08	200	400	600	33
Total (A +B)			255	1365	14	350	550	900	45

COURSE	CREDITS	MARKS
Tamil	8	200
English	12	300
Part III: Core & Elective	132	3000
Allied	20	500
Environmental Studies	4	100
Value Education	4	100
Total	180	4200

TAMIL-I

Course code	18KUG1TA1	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

நோக்கம்:

1. இக்கால இலக்கியங்களை அறிமுகப்படுத்துதல்
2. புதுக்கவிதை இலக்கணம், வரையறைகளைக் கற்பித்தல்
3. தற்கால புதுக்கவிஞர்களை அடையாளப்படுத்தி, புதுக்கவிதைகளின் போக்குகளை சுட்டிக்காட்டுதல்
4. பயன்பாட்டுடைய தற்காலத் தமிழைக் கற்றல்

மாணவர் பெறும் திறன்:

1. பிழையின்றி சுயமாக பேசவும், எழுதவும் பயிற்சி பெறல்
2. அரசுத் துறை சார்ந்த பணிகளுக்கு (போட்டித் தேர்வு) தயார்படுத்திக்கொள்ளுதல்
3. மரபு, புதுக்கவிதைகளை அறிந்துகொள்ளல்
4. மாணவர்கள் தங்களின் படைப்பாற்றலை வெளிப்படுத்திக்கொள்ளும் வாய்ப்பினை பெறுதல்.

அலகு I மரபுக்கவிதை

- | | |
|---------------------------------|--|
| 1. பாரதியார் | - கண்ணன் என் தாய் |
| 2. கண்ணதாசன் | - தத்துவப் பாடல்கள் - அவன் தான் இறைவன் |
| 3. பட்டுக்கோட்டை கல்யாணசுந்தரம் | - செய்யும் தொழிலே தெய்வம் |

அலகு II புதுக்கவிதை - I

- | | |
|----------------------|---|
| 1. கவிஞர் வாலி | - தூக்கத்தில் ஒரு துவந்த யுத்தம் - (நிஜகோவிந்தம்) |
| 2. வைரமுத்து | - அவன் கலைமகளுக்குப் பாடஞ் சொல்லுகிறான் (திருத்தி எழுதிய தீர்ப்புகள்) |
| 3. செளந்திரா கைலாசம் | - தெய்வீகம் - வளம்பெற வரம் தருவான் (செளந்திரா கைலாசம் கவிதைகள்) |

அலகு III

- | | |
|---------------------|---|
| 1. சேதுபதி | - இந்திய மாணவர் - (கனவுப்பிரதேசங்களில்) |
| 2. ந. பிச்சமூர்த்தி | - அக்னி (பிச்சமூர்த்தி கவிதைகள்) |

அலகு IV- பயன்பாட்டுத் தமிழ்

1. விண்ணப்பக் கடிதம் எழுதப் பயிற்சி
2. வல்லினம் மிகும் இடங்கள்
3. வல்லினம் மிகா இடங்கள்
4. பிழை நீக்கி எழுதுதல்

அலகு V இலக்கிய வரலாறு - I

1. சிறுகதையின் இலக்கியத் தோற்றமும் வளர்ச்சியும்
2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்.

BASIC ENGLISH

Course code	18KUG1EN1	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

OBJECTIVES:

- To enable the student to understand the main aspects of English grammar.
- To make him speak and write correct English without any grammatical error.

OUTCOMES:

- Student will be able to overcome his mother tongue influence gradually.
- The course will enable him to clear all the competitive exams successfully.

UNIT-I

Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection

UNIT-II

Verbs and classification: Main Verb, auxiliary verb, transitive verb, intransitive verb and phrasal verb. Tenses: simple present, present continuous, present perfect, present perfect continuous. Past: Simple past, past continuous, past perfect, past perfect continuous. Future: simple future, future continuous, future perfect, future perfect continuous. Voices: Active and Passive voice.

UNIT-III

Infinitives, Participles, Gerunds and Question Tags, WH questions.

UNIT-IV

Sentence construction, types of sentences: Declarative sentence, interrogative sentence, imperative sentence, exclamatory sentence, affirmative and Negative sentences.

UNIT-V

Linkers, Spotting Errors, Concord.

PRESCRIBED TEXT:

Effective English Communication for you- V. Syamala (Emerald Publishers)

SUGGESTED READING:

- 1) Modern English- N.Krishnasamy (Macmillan)
- 2) Pillai, Radhakrishna G.English Grammar and Composition. Chennai: Emerald Publishers,2005

MATHEMATICS - I

Course code	18KUG1AL1	Credits	04	Year	I
No. of Lecture	60	No. of Practical Hours	--	Sem	I

OBJECTIVES:

The main objectives for framing the syllabus of Mathematics for the B.Voc degree is to enhance the fundamental knowledge of the students in basic Mathematics such as

- Set theory
- Sequence and series
- Algebraic equations
- Matrices.

OUTCOMES:

- Students will able to analyse Mathematical techniques and applications.
- Students will able to solve the problems arise in engineering.

UNIT - I

Set and Functions: Introduction - Properties of operations on sets - De Morgan's laws - verification examples - Venn diagrams - formula for $n(A \cup B \cup C)$ - Functions.

UNIT - II

Sequences and series of real numbers: Introduction - Sequences - Arithmetic Progression (A.P) - Geometric Progression (G.P) - Series.

UNIT - III

Algebra: Solving Linear Equations - Polynomials - Synthetic division - Greatest Common Divisor (GCD) - Least Common Multiple (LCM) - Rational Expressions - Square root - Quadratic equations.

UNIT - IV

Matrices-I: Introduction - Types of Matrices - Addition and subtraction - Multiplication - Matrix equation.

UNIT - V

Matrices-II: Inverse of a matrix - Rank of a matrix - Solution of simultaneous linear equations.

Text Books:

1. Basic Mathematics, Science Series Rupa, Rupa Publications.
2. Business Mathematics and Statistics by P.A. Navnitham, Jai Publishers, 2012.

BASICS OF PRODUCTION

Course code	19KUP1C01	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

OBJECTIVES:

- Basic concepts of Production
- Casting technologies
- Basic measurement and measuring instruments
- Properties of materials

OUTCOMES:

- Student will be able to know about the basic concepts in manufacturing, various casting technologies, measurement, quality, various properties of different materials, metal forming and powder metallurgy.

Unit I

Introduction - Casting - Casting types - procedure to make sand mould - types of core making - moulding tools - machine moulding - special moulding processes - CO2 moulding - shell moulding - investment moulding - permanent mould casting - pressure die casting - centrifugal casting - continuous casting - casting defects - Basic steps in the process of metal casting; Patterns: Materials, types and design of Patterns, Pattern, Pattern allowances.

Unit II

Quality - Visual inspection - Measuring instruments - Types - Error - Calibration - Range - Selection - Measurements - System of measurement - Imperial system - Metric system - Quality standards - Quality control procedures - Inspecting equipments - Inspection - Hazards - Equipments.

Unit III

Measurement - Types of measurement - Direct and indirect - Linear measurement - Angular measurement - Profile checking - Calipers : Vernier, inside, outside - Gauges : Plug, Ring, Thread, Slip, Feeler, Vernier height gauge, Vernier Depth gauge - Micrometer : Outside, Inside, Depth - Least count.

Unit IV

Introduction: Internal forces, Stresses and strains, Types of stress and strain, Elasticity, Hooke's law, Poisson's ratio, Elastic constants and their relationship. Stress-strain diagram for ductile materials. Definition of creep, fatigue and stress relaxation. Types of materials - Properties of materials : Hardness, ductility, weldability, machinability, elasticity, plasticity, malleability, etc.,

Unit V

Principles and applications of the following processes: Forging - Rolling - Extrusion - Wire drawing and Spinning - Powder metallurgy - Principal steps involved advantages, disadvantages and limitations of powder metallurgy.

REFERENCE:

- Complete casting handbook 1st and 2nd Edition by John Campbell, Aug 2011 and 2015.
- Applied metrology for Manufacturing Engineering by Ammar Grous.
- Engineering Metrology and Instrumentation by R.K.Rajput.
- Materials Science and Engineering by Callister
- Powder Metallurgy Technology by G S Upadyay

PRODUCTION TECHNOLOGY - I

Course code	19KUP1C02	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	I

OBJECTIVES:

- Safety in working environment
- Fitting and its types
- Importance of Lathe
- Types and various operations performed in a Lathe
- Safety in Lathe
- Various special attachments in Lathe

OUTCOMES:

- Student will be able to do any type of fitting in metal components.
- Student will be able to operate a lathe to produce any component.
- Student will be able to work safely in a workshop.

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 - Safety Instructions.

Unit II

Fitting - Types of fitting - Fitting tools - Equipments - Reporting - Preparation of work area - Selection of raw materials - Inspection - Selection of tools and equipments - Work holding devices - Marking - Templates - Transfer / Trace - Hand tools and manually operated machine tools for fitting - Assembling - Inspection.

Unit III

Various operations in fitting - Drilling, Reaming, Boring, Tapping - Assembling equipments - Fasteners - Adhesives - Soldering - Brazing - Dismantling and assembling - Problem solving - Tool and die - Measure - Inspect - Procedure.

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

Mechanics of chip formation, single point cutting tool, forces in machining, Types of chip, cutting tools- nomenclature, orthogonal metal cutting, thermal aspects, cutting tool materials, tool wear, tool life, surface finish, cutting fluids and Machinability.

Unit V

Centre lathe, constructional features, specification, operations – taper turning methods, thread cutting methods, special attachments, machining time and power estimation. Capstan and turret lathes- tool layout – automatic lathes: semi automatic – single spindle : Swiss type, automatic screw type – multi spindle.

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

TAMIL-II

Course code	18KUG2TA2	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

நோக்கம் :

1. பக்தி இலக்கிய அறிமுகம்
2. சைவ, வைணவ பக்திப் பணுவல்கள் அறிமுகம்
3. சிற்றிலக்கிய வகையறிதல்
4. திருமுறைகள், பிரபந்தங்கள் வரலாறு அறிதல்

மாணவர் பெறும் திறன்:

1. பக்தி இலக்கிய காலத்தின் சமயம், பண்பாடு, பக்தி நெறி அறிதல்
2. அரசுப் போட்டித் தேர்வுகளுக்குத் தயார்படுத்திக் கொள்ளுதல்
3. பக்தி இலக்கியங்களின் வழி சைவ, வைணவம் தமிழுக்கு செய்த தொண்டினை அறிதல்

அலகு I சைவ இலக்கியங்கள்

1. திருஞானசம்பந்தர் - திருநீற்றுப் பதிகம் - (“மந்திரமாவது நீறு ...” எனத் தொடங்கும் பதிகம்)
2. திருநாவுக்கரசர் - திருஅங்கமாலை - (“ தலையே நீ வணங்காய்” எனத் தொடங்கும் பதிகம்)

அலகு II வைணவ இலக்கியங்கள்

1. ஆண்டாள் - நாச்சியார் திருமொழி - 6 ஆம் திருமொழி (வாரணமாயிரம் எனத் தொடங்கும் 10 பாடல்கள்)
2. நம்மாழ்வார் - திருவாய் மொழி - (“முனியே நான்முகனே” எனத் தொடங்கும் 10 பாடல்கள்)

அலகு III சிற்றிலக்கியங்கள் - பிற்கால இலக்கியம்

1. குமர குருபரர் - மதுரை மீனாட்சியம்மை பிள்ளைத் தமிழ்
 1. தாலப் பருவம் - (31) (“முதுசொற் புலவர் தெளித்த” எனத் தொடங்கும் பாடல்)
 2. அம்புலிப் பருவம் (72) (“ஏடகத்தெழுதாத” எனத் தொடங்கும் பாடல்)
2. தாயுமானவர் - எந்நாட்கண்ணி - (தெய்வ வணக்கம் - 11 கண்ணிகள்)

அலகு IV இலக்கிய வரலாறு - II

பன்னிரு திருமுறைகள்

அலகு V இலக்கிய வரலாறு -III

பன்னிரு ஆழ்வார்கள்

PROFESSIONAL ENGLISH

Course code	18KUG2EN2	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

OBJECTIVES:

- Preparing the student to be **competent in verbal and non-verbal communicative skills.**
- To enable him to overcome his all linguistic barriers systematically.
- To acquire the desirable proficiency in English language.

OUTCOMES:

- Enhanced **to achieve good communication skills.**
- Enable to face interviews successfully.

UNIT- I

Formal and Informal Communication.

Language for debate and discussion, Students' classroom language. Teacher's classroom language.

Situational English: welcome and thankfulness, making an appointment, asking about educational qualifications, at the post office, a customer at a bank, other situational conversations, visiting a doctor, travelling in a bus, hiring a taxi, at the railway station, reservation for air tickets, meeting after long interval, shopping, outing, watching television, looking for a room in a hotel, and going to the theatre.

UNIT -II

Public speaking skills, extempore, group discussion, job interview, mock sessions and current affairs.

UNIT -III

Writing paragraph, writing stories, picture comprehension, note writing, and note making.

UNIT -IV

Drafting an e-mail, report writing, writing letters, application, and resume preparation.

UNIT -V

Life Skills:

- a. Career planning
- b. Motivation
- c. Motivated goal setting
- d. Team work skills
- e. Time management skills.

Prescribed Texts :

1. T.M. Farhathullah: *English Practice Book for Undergraduates.* Emerald Publishers.
2. S. Raghavan : *A Textbook for Communication and Life Skills Practical.* Jey Publications.

OFFICE AUTOMATION

Course code	18KUG2AL2	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical	--	Sem	II

OBJECTIVES:

1. To develop the basic **computer operating skill of the student**
2. To enable the students to create and maintain their records in computer.
3. To create the knowledge for accessing Internet.

Outcomes:

- Students will able to record their documents by using computer.
- Students will able to access internet.

UNIT-I

BASIC COMPUTER SKILLS:Identifying Major Computer Components - How Computers Work - Turning on the Computer and Logging On - OPERATING SYSTEMS AND SOFTWARE - INTERNET.

UNIT-II

WORD: Introduction to Word Processing: Basic features - Full-Featured word processors - starting word - menus and toolbars - creating, editing and saving a word document - using word help - opening a document - moving multiple text selections simultaneously - link documents - creating table - working with graphics - mail merging - previewing and printing document.

UNIT-III

EXCEL: electronic spreadsheets - spreadsheet packages - starting excel - navigating in a workbook - create, name and save a new workbook - data entry-manual and automatic - correcting mistakes-spelling checker, undo and redo changes.

UNIT-IV

POWERPOINT: Presentation basics - presentation packages - starting PowerPoint - menus and toolbars - opening and saving an existing presentation - presentation using auto content wizard - presentation using design template - creating and saving a presentation using blank presentation.

UNIT-V

MS ACCESS: Use of MS Access - Controls - Customization - database design - filtering and sorting - conversation - database basics - import and export - forms - reports.

Text Book:

1. Alexis Leon, Mathews Leon, **Introduction to Computers with MS-Office**, Tata McGraw Hill Publication, 2003.

PRODUCTION TECHNOLOGY - II

Course code	19KUP2C03	Credits	04	Year	I
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	II

OBJECTIVES:

- Various machineries used in production.
- Various types of milling and grinding machines.
- Importance of special machines in production.

OUTCOMES:

- Student will be able to operate all the special machines used in production.

Unit I

Milling - Types of milling - Milling machine - Types - Constructional features - Main parts - Working principle - Inspection of machine - Cutters - Types - Work holding devices - Cutter holding devices - Flexibility of machine - Various operations - Gear cutting - Indexing head - indexing mechanism - Cutter - Types of cutter - Selection of cutter.

Unit II

Abrasive processes: grinding wheel - specifications and selection, types of grinding process - cylindrical grinding, surface grinding, centreless grinding and internal grinding - Typical applications - Grinding wheel - Designation - Preparation - Abrasives and types.

Unit III

Bond - Types of bonds - Materials - Preparation - Types - Various operations - Mounting of grinding wheels - Steps in mounting - Safety considerations - Speed - Feed - Depth of cut - Surface finish - Factors affecting surface finish - Dressing and truing of wheels - Cutter - Diamond cutter.

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 - 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.
- Milling - A complete course by Harold Hall
- Grinding Technology 2nd Edition by Stephen Malkin and Changsheng guo, May 2007.
- Handbook of machining with grinding wheels by by Ioan D. Marinescu, Mike P. Hitchiner, Eckart Uhlmann, W. Brian Rowe.

PRACTICAL - PRODUCTION TECHNOLOGY - I

Course code	19KUPT2P1	Credits	02	Year	I
No. of Lecture Hours	--	No. of Practical Hours	60	Sem	II

OBJECTIVES:

- To introduce different machining process and machine tool to develop components.

OUTCOMES:

- Ability to use the machine tool and processes to shape and fabricate the components.

FITTING:

1. Square filing
2. Profile cutting
3. T - Matting
4. V - Matting
5. Slide fit assembly
6. Drilling, Tapping and fitting

LATHE:

1. Study of Lathe and its main parts
2. Facing
3. Straight turning
4. Step turning
5. Chamfering
6. Taper turning
7. Drilling and Boring
8. Thread cutting
9. Knurling

PRACTICAL - PRODUCTION TECHNOLOGY - II

Course code	18KUPT2P2	Credits	02	Year	I
No. of Lecture Hours	--	No. of Practical Hours	60	Sem	II

Objectives:

- To get hands on experience in Special machines

Outcomes:

- Ability to use the special machine tool and processes
1. Six side milling
 2. Step milling
 3. Groove milling
 4. Gear Cutting
 5. Surface Grinding
 6. Cylindrical Grinding
 7. PCD Drilling

INTERNSHIP TRAINING-I

Course code	18KUPT2I1	Credits	20	Year	I
No. of Lecture Hours	--	No. of Practical Hours	1200	Sem	II

OBJECTIVES:

- To Understand quality and safety standards as per company's norms
- To gain practical knowledge
- To develop Self confidence
- To develop a good relationship with their co-workers.

Outcomes:

Students should undergo internship training in an esteemed Tool and Die making concern to gain hands on practice and practical industrial exposure.

Students are expected to submit their daily work report at the time of examination.

TECHNICAL COMMUNICATION

Course code	18KUG3EN3	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	III

OBJECTIVES:

- To make him **acquire the language skills** (Listening, Speaking, Reading and Writing) in English.
- To make him require group discussion and **public speaking skills**.

OUTCOMES:

- Student will be able to **overcome his inhibition in speaking in a forum**.
- The course will enable him to face the day to day official requirements.

UNIT-I (LISTENING)

- 1) Types of Listening
- 2) Implications of effective Listening

UNIT-II (SPEAKING)

- 1) Speaker, speech planning process.
- 2) Speech making process and speech effectiveness
- 3) Group Communication

UNIT-III (READING)

- 1) Reading Comprehension.
- 2) Improving comprehension skills
- 3) Techniques for good comprehension.

UNIT-IV (WRITING)

- 1) Sentence Construction
- 2) Techniques for Paragraph Development
- 3) Story Writing, Precis Writing

UNIT-V

- 1) Curriculum Vitae
- 2) Agenda, Minutes, Notices
- 3) Memo

PRESCRIBED TEXT:

- 1) Technical Communication Principles and Practice- Sangeeth Sharma & Meenakshi Raman
- 2) The Challenge of Effective Speaking -Thomas Wadsworth 14th ed, 2008
- 3) Effective English Grammar and Composition- V.Syamala, Emerald Publication.

MATHEMATICS - II

Course code	18KUG3AL3	Credits	4	Year	II
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	III

OBJECTIVES:

- To gain the basic knowledge about the Interest rate, solution of linear equations, differential and integral calculus.
- To provide the basic knowledge in trigonometry.

OUTCOMES:

- Student will be able to apply the basic Mathematical calculations in business problems..
- Students will able to understand the concepts of trigonometric functions.

Unit I:

Simple and Compound Interest - Discounting of Bills - True Discount - Banker's Gain.

Unit II:

Variables, Constants and Functions - Limits of Algebraic functions - Simple Differentiation of Algebraic functions - Meaning of Derivative - Evaluation of first and second order derivatives

Unit III:

Elementary Integral Calculus - Determining indefinite and definite integral of simple functions - Integration by parts

Unit - IV

Expansions of $\cos n\theta$, $\sin n\theta$ and $\tan n\theta$ - Expansion of $\sin\theta$ and $\cos\theta$ in a series of ascending powers of θ .

Unit - V

Hyperbolic functions - Relation between Hyperbolic functions - Inverse Hyperbolic functions - Real and Imaginary parts - Logarithm of complex numbers.

Text Book:

1. Business Mathematics and Statistics by PA. Navnitham, Jai Publishers, 2012.
2. Ancillary Mathematics (Volume I) by S. Narayanan, R. Hanumantha Rao, Manickavachagam Pillai and P. Kandaswamy, S.Viswanathan (Printers & Publishers) Pvt Ltd., 2007.

ENVIRONMENTAL STUDIES

Course code	18KUG3ENS	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical	--	Sem	III

OBJECTIVES:

1. To create the awareness among students regarding Environment.
2. To understand the causes of pollution and prevention methods

OUTCOMES:

- Students understand need to protect our environment from pollution for the development of our society.

UNIT-I

The Multidisciplinary nature of environmental studies-Definition, scope and importance. Need for public awareness-Natural Resources: Renewable and non-renewable resources:

Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effective on forests and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts, over water, dams benefits and problems.

UNIT-II

Ecosystems-Concept of an ecosystem.-Structure and function of an ecosystem.-Producers, consumers and decomposers.-Energy flow in the ecosystem.-Ecological succession.-Food chains, food webs and ecological pyramids.

UNIT-III

Biodiversity and its conservation-Introduction - Definition: genetic, species and ecosystem diversity.-Biogeographical classification of India-Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.-Biodiversity at global, National and local levels-India as a mega-diversity nation-Hot-spots of biodiversity-Threats to biodiversity: habitat loss, poaching of wildlife, manwildlife conflicts.-Endangered and endemic species of India-Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-IV

Environment Pollution:Causes, effects and control measures of:Air pollution-Water pollution-Soil pollution-Marine pollution-Noise pollution-Thermal pollution-Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.

UNIT-V

Social Issues and the environment.-From Unsustainable to Sustainable development-Urban problems related to energy-Water conservation, rain water

harvesting watershed management.-Resettlement and rehabilitation of people; its problems and concerns

Case studies: Environment ethics: Issues and possible solutions.

TEXT BOOK:

1. Title: ENVIRONMENTAL STUDIES - **Publication:** Published by Bharathiar University.

ADVANCED PRODUCTION TECHNOLOGY

Course code	19KUP3C04	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	III

OBJECTIVES:

- Understand concepts of Computer Numerical Control.
- Fundamentals of CNC, EDM, IM and AM.
- Understand the conventional and unconventional machining processes.
- Importance of CNC, EDM, IM and AM.

OUTCOMES:

CO1: Develop knowledge to operate CNC machines, EDM and IM machines.

CO2: Learning a part program for any component and setting up in machines.

CO3: Understand and find the ideas to select the AM process for a particular job.

Unit - I

Types of plastics - Characteristics of the forming and shaping processes - Moulding of Thermoplastics - Working principles and typical applications of Injection moulding - Plunger and screw machines - Blow moulding - Rotational moulding - Film blowing - Extrusion - Typical industrial applications - Processing of Thermosets - Working principles and typical applications - Compression moulding - Transfer moulding.

Unit II

Principle and working and applications of unconventional machining processes such as Electric Dischargemachining (EDM), Electro- Chemical machining (ECM), Ultrasonic Machining (USM), and Abrasive Jet machining (AJM)

Unit III

Introduction - Co-ordinate positioning (Absolute, Incremental), use of sub routines, macros and canned cycles- CAD/CAM CNC Program - Tooling and work holding devices - Symbols used in program - Address characters function - G codes and M codes- identify different parts of the CNC turning machine - 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 - IV

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.

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.

Unit - V

Overview - Need - Development of Additive Manufacturing Technology -Principle - AM Process Chain- Classification -Rapid Prototyping- Rapid Tooling - Rapid Manufacturing - Applications- Benefits - Case studies - Basics of Photo polymerization - Powder Bed Fusion - Extrusion Based System - Sheet Lamination Process - Droplet formation technologies - Three Dimensional Printing - Beam Deposition Process.

REFERENCE:

- Injection Molding Reference Guide by Jay.W.Carender
- 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
- Tom Page "Design for Additive Manufacturing" LAP Lambert Academic Publishing, 2012.
- Andreas Gebhardt "Understanding Additive Manufacturing: Rapid Prototyping, Rapid Manufacturing" Hanser Gardner Publication 2011.

PRACTICAL -ADVANCED PRODUCTION TECHNOLOGY

Course code	19KUPT3P3	Credits	03	Year	II
No. of Lecture Hours	--	No. of Practical Hours	60	Sem	III

OBJECTIVES:

- To Study and practice the various operations that can be performed in lathe, drilling, milling machines and EDM etc. and to equip with the practical knowledge required in the core industries.

Outcomes:

- Ability to use different machine tools for finishing operations.
- Ability to understand principle of working of advanced production technology machineries.

1. Plain turning and facing
2. Step turning
3. Thread cutting
4. Turning and facing cycles
5. Face milling
6. Drilling and Boring
7. Profile milling
8. Study of EDM Machines
9. Setting of Work in EDM
10. Profile cutting in EDM
11. Study of 3D Printer

TECHNICAL DRAWING

Course code	18KUG4AL4	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.

OUTCOMES:

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

- Geometric construction
- Orthographic and Isometric projections
- Symbols widely used in Electrical and Electronics circuits

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

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

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.

OUTCOMES:

Students will able to understand the basic managerial functions of an organization

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.

விழுமியக் கல்வி (VALUE EDUCATION)

Course code	18KUG4VAD	Credits	04	Year	II
No. of Lecture Hours	60	No. of Practical	--	Sem	IV

நோக்கம்:

1. சமுதாயம், இயற்கை மீதான சமூக அக்கறையை மானுட மதிப்புகளுடன் வளர்க்கச் செய்தல்
2. வாழ்வியல் நெறிகளை அறிதல்
3. காப்பியங்களில் சுட்டப்பெறும் வாழ்வியல் விழுமியங்களைக் கற்பித்தல்
4. பண்பாட்டுச் சமய விழுமியங்களை மாணவர்களுக்கு எடுத்துரைத்தல்.

மாணவர் பெறும் திறன்:

1. மாணவர்கள் வளமான மனநலத்தை, இலக்கிய விழுமியங்களால் பெறுதல்
2. வாழ்வியல் நெறிகளை அறிந்து பயன் பெறுவர்
3. பண்பாட்டு விழுமியங்களை அறிந்து கொள்வர்

அலகு - ஐ

விழுமியம் - சொற்பொருள் விளக்கம் - தனிமனித விழுமியங்கள் - சமூக விழுமியங்கள் - பண்பாட்டு விழுமியங்கள் - ஆன்மீக விழுமியங்கள்.

அலகு - ஐஐ

தனிமனித விழுமியங்கள் - சிந்தனைகள் தனிமனித ஒழுக்கம் - அன்பு - பொறுமை - நன்றெறி - கருணை - இரக்கம் - குற்றம் - சட்டம் - தண்டனை.

அலகு - ஐஐஐ

பண்பாட்டு விழுமியங்கள் - தமிழர்களின் பண்பாட்டு - மொழி - வீரம் - நட்பு - விருந்தோம்பல் - ஈகை - கொடை - கற்புடமை - தமிழ் கூறும் நல்லுலகம்.

அலகு - ஐஐ

சமூக விழுமியங்கள் - காந்திய விழுமியங்கள் - பாரதி காட்டும் சமூக விழுமியங்கள் - வ. உ. சிதம்பரம் வாழ்வியல் விழுமியம்.

அலகு - ஏ

ஆன்மீக விழுமியங்கள் - குருதேவர் ஸ்ரீ ராமகிருஷ்ணர் வாழ்வும் வாக்கும் - சுவாமி விவேகானந்தரின் வாழ்வியல் நெறிகள் - புத்தர் காட்டும் ஆன்மீக விழுமியங்கள்.

குறிப்பு தயாரிக்கப்பட்ட பாடஉரை அளிக்கப்படும்

DRAFTING AND PLOTTING

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

OBJECTIVES:

- To understand the need of Drafting and plotting
- To understand the design requirements
- To create and modify the design

OUTCOMES:

- Student will be able to create and edit the design.
- Student will be able to modify the designs as per the requirement.

UNIT - I

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

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

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

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

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.Sarkar

PRACTICAL: DRAFTING AND PLOTTING

Course code	18KUPT4P4	Credits	03	Year	II
No. of Lecture Hours	--	No. of Practical Hours	60	Sem	IV

OBJECTIVES:

- To develop skill to use software to create 2D and 3D models.

OUTCOMES:

- Ability to use the software packers for drafting and modeling.

Ability to create 2D and 3D models of Engineering Components.

1. Introduction to Auto Cad
2. **Tool bars and Menu bars**
3. Create simple Engineering drawings (Ellipse, Parabola, Hyperbola, Cycloid, Involute)
4. **Create simple mechanical designs**

INTERNSHIP TRAINING-II

Course code	18KUPT4I2	Credits	20	Year	II
No. of Lecture Hours	--	No. of Practical Hours	1400	Sem	IV

OBJECTIVES:

- To obtain hands on training of CNC machines and EDM.
- To Coordinate with the design team
- To develop a good relationship with their co-workers

Outcomes:

Students should undergo internship training in an esteemed Tool and Die making concern to gain hands on practice and practical industrial exposure.

Students are expected to submit their daily work report at the time of examination.

TOTAL QUALITY MANAGEMENT

Course code	18KUG5EL2	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.

OUTCOMES:

- Students gain the knowledge of Quality management principles and Techniques

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 - PDCA 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

MATHEMATICS – III

Course code	18KUG5AL5	Credits	04	Year	III
No. of Lecture Hours	60	No. of Practical Hours	--	Sem	V

OBJECTIVES:

- To understand the concepts of solving numerical algebraic equations and transcendental equations.
- To use interpolation and numerical differentiation.
- To provide the basic concepts of Measures of central tendencies and dispersion.

OUTCOMES:

- Students will be able to solve numerical algebraic equation and transcendental equations.
- Students will be able to solve the real world problems.
- Students will be able to understand Mathematical techniques and applications.

Unit - I

THE SOLUTION OF NUMERICAL, ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction - The Bisection method - Iteration method - The Method of False Position- Newton's Iteration method.

Unit - II

INTERPOLATION: Introduction - Linear Interpolation - Gregory Newton Forward Interpolation Formula - Gregory Newton Backward Interpolation Formula - Equidistant terms with one or more missing values.

Unit - III

NUMERICAL DIFFERENTIATION: Newton's Forward Difference Formula to compute the Derivatives - Newton's Backward Difference Formula to compute the derivatives - Derivatives using Stirling's formula

Unit - IV

MEASURES OF CENTRAL TENDENCIES: Arithmetic Mean, Median and Mode, Geometric mean, Harmonic mean.

Unit - V

MEASURES OF DISPERSION: Range, Mean deviation, Quartile deviation, Standard deviation, Co-efficient of variation.

Text Book:

1. Numerical methods by P.Kandasamy, K.Thilakavathy, K.Gunavathy, 2003 Edition.
2. Statistics, RSN. Pillai & Bhagavathi, Sultan Chand Publishers, reprint 2002.

INDIAN VALUES

Course code	18KUG5EL3	Credits	4	Year	III
No. of Lecture Hours	60	No. of Practical Hours	-	Sem	V

Objective:

- To create an awareness of values promoted in the cultural and spiritual heritage of India and to impart means to inculcate these values for one's personal growth and national development.

OUTCOMES:

- Students will understand the importance of our cultural and spiritual heritage from the life history of national leaders.

UNIT I- Character formation through Positive personality

Truthfulness, Sacrifice, Sincerity, Self Control, Altruism, Tolerance, Cultivating will-power and character building - Swami Vivekananda's ideas on Personality Development - Strength - Faith in one's self - Self-confidence - Ego, overconfidence and inferiority complex .

UNIT II- Holy Mother Sarada Devi Life

Birth of holy mother- The holy life of Sarada Devi with Bahavan Sri Ramakrishna- Message of Sarada Devi to the world

UNIT III- Yoga's

Introduction to Yoga - Asanas, Pranayama & Meditation - Benefits of Yoga - Four types of Yoga (Karma yoga - Bakthi Yoga- Raja Yoga- Gnana Yoga)- Control of Mind through Yoga & Meditation.

UNIT IV- The inspirational life of Indian leaders

Rabindranath Thagore- Sri. Aurobindo- Balagangathara Thilak- Vinobabave- Nethaji Subash Chandra Bosh- Baghat singh, Rajaguru, Sukdev- Theeran Chinnamalai- Dr. A.P.J. Abdhul Kalam.

UNIT V- Importance days of India

Independence Day -Republic Day- Dandhi Salt March- Jallianwallah Bagh Massacre Day- Sepoy Mutiny- Battle of Plassey- Kargil Victory Day.

Reference books:

1. Personality development by Swami Vivekananda
2. Holy Mother by Swami Nikhilananda
3. My India, The India Eternal by Swami Vivekananda

TOOL DESIGN - I

Course code	19KUP5C06	Credits	05	Year	III
No. of Lecture Hours	75	No. of Practical Hours	--	Sem	V

OBJECTIVES :

- Identify the Difference between Jig & Fixtures
- Explain possible freedom of movement of job in a jig, fixtures
- Study locating of work piece in a jig, fixture
- To understand the construction of various types of Jigs and Fixtures
- Explain mounting of jig on a machine tool
- Explain mounting of fixtures on the machine tool
- Design jig and fixtures
- Design of plug and snap gauges

OUTCOMES:

- Student will be able to differentiate jig and fixture
- Student will be able to design a jig or fixture for a special purpose
- Student will be able to mount a jig or fixture in any machine component.

UNIT - I

Introduction - Jigs and Fixtures - Difference between Jigs and Fixtures - Advantages of Jigs and Fixtures - Elements of Jigs and Fixtures - Fool Proofing - Materials used in Jigs and Fixtures - Degrees of Freedom - 12 degrees of freedom - 6 points location principle (or) 3-2-1 principle of location - Essential features of Jigs and Fixtures- General Design Principles - Design steps - Common defects in Jig Design.

UNIT - II

Principles of location - location point - types of locators - pins and studs - V block - cup and cone location points - adjustable locating points - special adjustable stops - location from finished holes in the work - Diamond pin locator - types of clamps - lever clamp - hinged clamp - two way clamp - Swinging clamp - wedge clamp - eccentric clamping arrangement - Quick action clamp - Pneumatic and Hydraulic clamps.

UNIT - III

Materials for Jig bushing - press fit bushings - Fixed renewable bushings - slip renewable bushings - Liner bushings - screw bushings - miscellaneous type of drill bushings - bushing specifications.

Open drill jig - plate drill jig - template drill jig - channel drill jig - turn over drill jig - angle plate drill jig - closed box drill jig - leaf drill jig - Post jig - Pot jig - indexing drill jig - universal drill jig - design of template and leaf jigs.

UNIT - IV

Introduction: principles of fixture design – elements of fixtures – design consideration of locators and clamps for fixtures – types of fixtures – Design of turning fixtures - Mandrels – Type of mandrels - Boring fixtures – Milling fixtures – essentials of milling fixtures - method of locating milling fixtures with respect to cutter position – Grinding fixtures – surface grinding and cylindrical grinding.

UNIT - V

Introduction – limit gauges -Taylor's principle of limit gauging – Application of limit gauges – gauge makers tolerance – allowance for gauge wear – material for limit gauge – three basic types of limit gauges – Disposition of gauge tolerance and wear allowance – plug gauge – snap gauge – ring gauge – thickness and length gauges – recess gauge – step gauge – position and receiver gauges – IS specifications for gauges – Design of plug and Snap gauges.

Text Books:

1. Donoldson.C and Others, "Tool Design", Tata McGraw Hill, 1978
2. Kempster, "Introduction to Tool Design and Jigs and Fixtures", ELBS

Reference Books:

1. ASTME, "Hand book of Fixture Design"
 2. Korsakov, "Fundamental of Fixture Design", MIR Publication, Moscow
 3. Goroshkin.A.K., "Jigs and Fixtures Handbook", MIR Publication, Moscow
- Houghton, "Jigs & Fixture Design"

PRACTICAL: DESIGN AND MANUFACTURING

Course code	18KUPT5P5	Credits	03	Year	III
No. of Lecture Hours	--	No. of Practical Hours	60	Sem	V

OBJECTIVES:

- To make Sketching, Part design, Assembling, Drafting and detailing, Modelling and standards with respect to manufacturing details.
- Creo is equipped with all the capabilities that are required for completing a product design.

OUTCOMES:

CO1: Create the new ideas and knowledge about Creo software.

CO2: Understand the various methods and commands in Creo software's.

1. Introduction and 2D modelling
2. 3DSolid modelling
3. Surface and Sheet metal modelling
4. Drafting and assembly
5. Manufacturing

PROFESSIONAL ETHICS AND HUMAN VALUES

Course code	18KUG6EL4	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

OUTCOMES:

- Students got aware of Ethics and moral values.
- Students understand the importance of Ethics and code of conduct in business.
- Students got social responsibility in business and importance of human values

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

Course code	18KUG6EL5	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

OUTCOMES:

- Students will understand the concept of safety rules
- Students will be able to handle the materials and tools safely
- Students will follow the road and electrical safety

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	18KUG6EL6	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.

OUTCOMES:

- Student will be well versed in the concept related to entrepreneur, knowledge in the finance institutions, project report, incentives and subsidies.

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. 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.

TOOL DESIGN - II

Course code	19KUP6C07	Credits	05	Year	III
No. of Lecture Hours	75	No. of Practical Hours	--	Sem	VI

OBJECTIVES :

- Explain the basics of Die casting process.
- Explain the working of die casting machines.
- Design die casting die
- Explain the design procedure for injection moulding.
- Explain the working of injection moulding machine
- Understand the intermediate injection moulding design concepts

OUTCOMES :

- Students will be able to design the die for die casting process.
- student will be able to design a die for injection moulding process.

UNIT - I

Press Working Operations:- Operation for producing blanks - Shearing, cutting off, parting, blanking. Operation for cutting holes - Punching, piercing, slotting, perforating. Operations for progressive working - Notching, semi notching, lancing, parting, cutting off. Operations for size control - Trimming, slitting, shaving. Safety in press working.

Press Working Mechanism:- Presses according to their functions - energy producing press, force producing presses, stroke controlled presses. Press according to their energy supply - Mechanical, hydraulic, Pneumatic, electromagnetic presses. Presses according to their construction - Solid or gap frame, open back inclinable, knee frame, horning, open end or end wheel. Press according to their operation - Single action, double action, triple action, multi slide press.

UNIT - II

Types of Die Construction:- Cut off, drop through, return type, compound, combination, continental, sub press, follow die, progressive die, transfer die, shuttle die. Function and nomenclature of die components:- Die, die set, die plate, punch, stripper plate, Die spring, rubber keeper, stripper bolt, solid stripper, knockout plate, hold down plate, pad plate, blank holder, pressure pin, die cushion. Attachment components - Dowel, screw, key. Miscellaneous components - Heal, stop block, bolster plate, backing plate, pilot, gauges, insert, cams, hinges and rockers.

UNIT - III

Die Casting Processes:- Hot chamber process, Cold chamber process, low pressure die casting process, advantages and disadvantages, comparison of hot and cold chamber processes, applications, heat transfer in the die and methods of controlling die temperature.

Die Casting Materials:- Types of die casting alloys -metallurgy, melting & casting procedure and application of zinc based die casting alloys, Aluminum base alloys, Magnesium base alloys, Copper base alloys, Lead base alloys and Tin base alloys.

Die Casting Machines:- Plunger machine, air machine, modern cold chamber machines. Die locking methods, injection systems, automatic cycle control, interlock and safety devices in die casting machines.

Die Casting Defects: Definition, causes and remedies of defects – Shrink holes, Gas holes, Segregation, Shrink cracks, Porosity, Cold shuts, Flow lines & Blooms, Foliations, Hard spots, Surface draws and Depressions, Soldering, sink mark and excessive flash.

UNIT - IV

Die Casting Die Design: Flow system – Importance, metal flow systems in die casting dies, goose neck, nozzle, sprue, runners systems, shock absorbers, gate, gate area, gate velocity, air vent, overflow, determination of gate area. Procedure to calculate runner and gating dimensions using PQ2 diagram, calculating runner and gating dimensions without PQ2 diagram. Consideration of specification of die casting machines. Ejection systems – need and working of ejection system, Types of ejection system – sleeve, ring, blade

Injection Moulding Machines: Basic parts and functioning of an injection moulding machine. Types of injection moulding machine (Screw type & Plunger Type) – Single stage and two stage – Clamping unit (Toggle & Hydraulic) – Types of nozzles – Typical injection. Moulding cycle, Cycle time – Machine specifications (Definition only).

UNIT - V

Functional systems of injection mould – Sprue and runner – Core and Cavity- Shrinkage calculation – Core and cavity dimension. Parting surface – clamping – direct, indirect – Cooling System – Cooling Integer type cavity plates – Cooling integer type core plate – Cooling bolster – Cooling cavity inserts – Cooling core inserts – Water connection and seals. (Concept & Description of design only) – Ejection system: Ejector grid – Ejector plates assembly – Ejector rod, Ejector plate and ejector retaining plate – Methods of Ejection – Ejection from fixed half- Sprue puller.

Basic Procedure for Mould Design – Determination of mould size – Maximum number of cavities, Clamping force, Maximum clamping area, Required opening stroke. Computation of number of cavities, cavity layouts, number of parting lines, Design of runner and gate.

Alignment of Moulds: Functions of alignment, alignment with the axis of the plasticating unit, internal alignment and interlocking, alignment of large moulds. Changing of moulds – system for a quick change of moulds for thermoplastics, mould exchanger for elastomer moulds.

Text Books:

1. Pye.R.G.W., "Injection Mould Design", Affiliated East – west press pvt Ltd, 2000
2. Athalye.A.S., 'Injection Moulding', 2nd Edn., Multi Tech Publishing Co., 1998
3. George menges and Paul mohren, "How to make Injection moulds", Hawer publishers, 1991

Reference Books:

1. Briston and Gosselin, "Introduction to Plastics", Newnes-Butterworths, London, 1970
2. Mills.N.J., "Plastics", ELBS, 1986
3. Dominick V.Rosato and Donald V.Rosato., "Injection Moulding Hand Book", CBS Publishers & Distributors, Delhi, 1987
4. Athalye.A.S., "Plastics Materials Handbook", Multi Tech Publishing Co., 1995
5. Athalye.A.S., "Moulding of Plastics", Multi Tech Publishing Co., 1998

PROJECT

Course code	18KUPT6PR	Credits	05	Year	III
No. of Lecture Hours	--	No. of Practical Hours	240	Sem	VI

Objectives:

To develop the ability to solve a specific problem right from its identification and literature review till the successful solution and train the students in preparing project reports and to face reviews and viva voce examination.

Outcomes:

Develop or design tool, die, jig or fixture working model suitable for real practical environment by implementing the theoretical and practical knowledge gained through the curriculum.

Develop the plan by considering the following parameters

- a) Material Requirement
- b) Analyze the specification and quantity of required materials
- c) Cost estimation.
- d) Time and resource required for completing a product
- e) Man power planning
- f) Maintain proper documents and reports wherever required

INTERNSHIP TRAINING-III

Course code	18KUPT6I3	Credits	20	Year	III
No. of Lecture Hours	--	No. of Practical Hours	1200	Sem	VI

OBJECTIVES:

- To Understand the work requirement
- To Understand the customer and market requirement
- To design and modify a tool or die as per the requirement
- To Report and document completion of work
- To research the existing designs and innovate new design modifications.

Students should undergo internship training in an esteemed Tool and Die making concern to gain hands on practice and practical industrial exposure.

Students are expected to submit their daily work report at the time of examination.

SCHEME OF EXAMINATION
(For General Education and Vocational Education Component)

General Rule of Examination:

Every student should earn a minimum attendance of 75% to become eligible to appear for Semester Examinations.

To pass in an examination, a student has to score a minimum of 40% marks in each theory & practical paper (Internal and External combined but with a minimum of 40% marks in internal and external).

Evaluation of student's performance for the theory, practical and Internship Training part includes two components.

Components	Internal Marks	External Marks	Total Marks
General and Vocational Component (Theory)	50	50	100
Vocational Component (Practical)	50	50	100
Vocational Component (Internship Training)	100	300	400

Continuous Internal Assessment:

Two CIA tests conducted for each paper during each semester.

CIA for General and Vocational component (Theory):

S.No	Type	Units	Max. Marks
1.	CIA test - I	1 & 2	20 Marks
2.	CIA test - II	3, 4 & 5	25 Marks
Total			45 Marks

Internal Marks (Theory):

Internal Marks- Break up (50 Marks)		
A	CIA - I & CIA - II test (45 marks converted to 30 Marks)	30 Marks
B	Percentage of Attendance 95% - and above - 10 Marks 90% - 94% - 8 Marks 85% - 89% - 6 Marks 81% - 84% - 4 Marks 75% - 80% - 2 Marks	10 Marks
C	Marks for Assignment / Seminar	10 Marks
Total		50 Marks

Internal Marks (Practical):

Internal Marks- Break up (100 Marks)		
A	Model practical Examination	50 Marks
B	Percentage of Attendance 95% - and above - 10 Marks 90% - 94% - 8 Marks 85% - 89% - 6 Marks 81% - 84% - 4 Marks 75% - 80% - 2 Marks	10 Marks
C	Record Note	20 Marks
D	Overall performance in the class	20 Marks
Total		100 Marks

Total 100 marks will be converted to 50 marks and the same will be awarded as an internal mark for practical.

QUESTION PAPER PATTERN

- 1) The question paper pattern and coverage of syllabus for each CIA and External (semester) examinations for all General and vocational component subjects except Environmental Studies.

CIA TEST - I (Unit 1 & 2 only)

Time: 1Hour

Max. Marks: 20

Part - A	No choice (Five questions from unit 1 & 2)	5 x 2 = 10
Part - B	Two out of three (Three questions from unit 1 & 2)	2 x 5 = 10

CIA TEST - II (Unit 3, 4 & 5 only)

Time: 1½ Hour

Max. Marks: 25

Part - A	No choice (Five questions from unit 3, 4 & 5)	5 x 2 = 10
Part - B	Answer any Three questions out of Five (Five questions from unit 3, 4 & 5)	3 x 5 = 15

SEMESTER EXAMINATION (All Five Units)

Time: 2 Hours

Max. Marks: 50

Part - A	No Choice (Ten questions from All five units)	10 x 2 = 20
Part - B	Answer any Five questions out of Eight (Eight questions from All five units)	5 x 6 = 30

- 2) Both internal Assessment and Semester Examination **for Environmental Studies (III semester- General Component)** will be conducted through online exam.