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

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

# B.Voc., Degree course ( Three years)

## Technology in Electrical and Electronic Devices

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

# SYLLABUS

**(ACADEMIC YEAR 2016-2017 Onwards)**

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

For students admitted from 2016-2017 & onwards

## COURSE OF STUDY

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

## ELIGIBILITY:

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

## CURRICULUM OUTLINE

### SEMESTER – I

| Course Code | Part | Name of the Course | Lecture / Practical Hrs | | Duration of Exam in Hours | Marks | | Total Marks | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lecture | Practical / Field Work | | Internal | External | | |
| **GENERAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUGE101 | II | Basic English | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUGE102 | III | Allied I: Mathematics- I | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUG1ENS | IV | Environmental studies | 60 | - | 2 | 50 | 50 | 100 | 4 |
| **Sub Total (A)** | | | **180** | **-** | **06** | **150** | **150** | **300** | **12** |
| **VOCATIONAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUTE101 | III | Core I: Basics of Electrical and Electronic Devices | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUTE1P1 | III | Practical I: Electrical and Electronic Devices Lab | - | 120 | 3 | 50 | 50 | 100 | 4 |
| **Sub Total (B)** | | | **60** | **120** | **05** | **100** | **100** | **200** | **08** |
| **Total (A +B)** | | | **240** | **120** | **11** | **250** | **250** | **500** | **20** |

**T-Theory**

**P-Practical**

**SEMESTER – II**

| Course Code | Part | Name of the Course | Lecture / Practical Hrs | | Duration of Exam in Hours | Marks | | Total Marks | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lecture | Practical / Field Work | | Internal | External | | |
| **GENERAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUGE203 | III | Allied II: Office Automation | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUGE204 | II | Professional English | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUG2VAL | IV | Value Education | 60 | - | 2 | 50 | 50 | 100 | 4 |
| **Sub Total (A)** | | | **180** | **-** | **06** | **150** | **150** | **300** | **12** |
| **VOCATIONAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUTE202 | III | Core II: Supervise assembly line activities | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUTE203 | III | Core III: Linear Integrated Circuits | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUTE2I1 | III | Internship Training-I | - | 1400 | 3 | 100 | 300 | 400 | 20 |
| **Sub Total (B)** | | | **120** | **1400** | **07** | **200** | **400** | **600** | **28** |
| **Total (A +B)** | | | **300** | **1400** | **13** | **350** | **550** | **900** | **40** |

**T-Theory**

**P-Practical**

**SEMESTER – III**

| Course Code | part | Name of the Course | Lecture / Practical Hrs | | Duration of Exam in Hours | Marks | | Total Marks | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lecture | Practical / Field Work | | Internal | External | | |
| **GENERAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUGE305 | II | Technical Communicatio | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUGE306 | III | Allied III: Mathematics-II | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUGE307 | III | Elective I: Principles of management | 60 | - | 2 | 50 | 50 | 100 | 4 |
| **Sub Total (A)** | | | **180** | **-** | **06** | **150** | **150** | **300** | **12** |
| **VOCATIONAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUTE304 | III | Core IV: Digital Electronics | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUTE3P2 | III | Practical II: Analog and Digital Electronics Lab | - | 120 | 3 | 50 | 50 | 100 | 4 |
| **Sub Total (B)** | | | **60** | **120** | **05** | **100** | **100** | **200** | **08** |
| **Total (A +B)** | | | **240** | **120** | **11** | **250** | **250** | **500** | **20** |

**T-Theory**

**P-Practical**

**SEMESTER – IV**

| Course Code | Part | Name of the Course | Lecture / Practical Hrs | | Duration of Exam in Hours | Marks | | Total Marks | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lecture | Practical / Field Work | | Internal | External | | |
| **GENERAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KU GE408 | III | Allied IV: Technical Drawing | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KU GE409 | III | Elective II: Profession Ethics and Human values | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KU GE410 | III | Elective III: Indian Values | 60 | - | 2 | 50 | 50 | 100 | 4 |
| **Sub Total (A)** | | | **180** | **-** | **06** | **150** | **150** | **300** | **12** |
| **VOCATIONAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KU TE405 | III | Core V: Develop Procurement Schedule | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KU TE406 | III | Core VI: Develop Production | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KU TE4I2 | III | Internship Training-II | - | 1400 | 3 | 100 | 300 | 400 | 20 |
| **Sub Total (B)** | | | **120** | **1400** | **07** | **200** | **400** | **600** | **28** |
| **Total (A +B)** | | | **300** | **1400** | **13** | **350** | **550** | **900** | **40** |

**T-Theory**

**P-Practical**

**SEMESTER – V**

| Course Code | Part | Name of the Course | Lecture / Practical Hrs | | Duration of Exam in Hours | Marks | | Total Marks | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lecture | Practical / Field Work | | Internal | External | | |
| **GENERAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUGE511/5H1 | I | Tamil I / Hindi I | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUGE512 | III | Allied V: Mathematics – | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUGE513 | II | Elective IV: Total Quality Management | 60 | - | 2 | 50 | 50 | 100 | 4 |
| **Sub Total (A)** | | | **180** | **-** | **06** | **150** | **150** | **300** | **12** |
| **VOCATIONAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUTE507 | | Core VII: Microprocessor and Microcontroller | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUTE5P3 | | Practical III: Microprocessor and Microcontroller Lab | - | 120 | 3 | 50 | 50 | 100 | 4 |
| **Sub Total (B)** | | | **60** | **120** | **05** | **100** | **100** | **200** | **08** |
| **Total (A +B)** | | | **240** | **120** | **11** | **250** | **250** | **500** | **20** |

**T-Theory**

**P-Practical**

**SEMESTER – VI**

| Course Code | Part | Name of the Course | Lecture / Practical Hrs | | Duration of Exam in Hours | Marks | | Total Marks | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lecture | Practical / Field Work | | Internal/Theory | External/Practical | | |
| **GENERAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUGE614 / 6H2 | I | Tamil II / Hindi II | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUGE615 | III | Elective V: Safety Engineering | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUGE616 | III | Elective VI: Entrepreneurship Development | 60 | - | 2 | 50 | 50 | 100 | 4 |
| **Sub Total (A)** | | | **180** | **-** | **06** | **150** | **150** | **300** | **12** |
| **VOCATIONAL EDUCATION COMPONENT** | | | | | | | | | |
| 16KUTE608 | III | Core VIII: Develop Hardware product for Manufacturing | 60 | - | 2 | 50 | 50 | 100 | 4 |
| 16KUTE6PR | III | Project | - | 120 | 3 | 50 | 50 | 100 | 4 |
| 16KUTE6I3 | III | Internship Training-III | - | 1400 | 3 | 100 | 300 | 400 | 20 |
| **Sub Total (B)** | | | **60** | **1520** | **08** | **200** | **400** | **600** | **28** |
| **Total (A +B)** | | | **240** | **1520** | **14** | **350** | **550** | **900** | **40** |

**T-Theory**

**P-Practical**

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

## BASIC ENGLISH

| **Course** code | 16KUGE101 | Credits | 04 | Year | I |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical | -- | 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.
- To make him acquire the language skills (Listening, Speaking, Reading and Writing) in English.

**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 | 16KUGE102 | Credits | 04 | Year | I |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical | -- | 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
- Co-ordinate geometry
- 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(AUBUC) – 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:** Intoduction – Types of Matrices – Additional and subtraction – Multiplication – Matrix equation.

**UNIT – V**
**Coordinate Geometry:** Introduction – Distance between two points – Section formula, midpoint formula, Centroid formula – Area of triangle and quadrilateral – straight line.

**Text Books:**
Basic Mathematics, Science Series Rupa, Rupa Publications

## ENVIRONMENTAL STUDIES

| **Course** code | 16KUG1ENS | Credits | 04 | Year | I |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical | -- | Sem | I |

**OBJECTIVES:**

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

**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-Conversation 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.

## BASICS OF ELECTRICAL AND ELECTRONIC DEVICES

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

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I: FUNDAMENTALS OF ELECTRICITY**

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

**UNIT II: D.C. MACHINES AND TRANSFORMERS**

DC Generator – construction- Working principle - characteristics–types- Applications
DC motor- construction- Working principle - characteristics–types- Applications
Necessity of starter - 3 point starter, 4 point starter
**Single Phase transformer:** Working Principle and Construction of transformer ––– Applications – Step up and Step down transformer (Definition only)

**UNIT III: A.C.MACHINES**

Single phase Induction motor - construction & principle of operation-Types
Three phase induction motors – Squirrel cage and slip ring Induction motors (construction and working principle only)
Alternator- construction – Principle of operation
Necessity of starters – DOLand star/delta, auto transformer -application

**UNIT IV: ELECTRONICS DEVICES**

Types of materials – Conductor, semiconductor, insulator
**DIODES:**Working principle and characteristics of PN junction diode – Zener diode – Varactor diode – its specification.

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

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

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

**UNIT V: ELECTRONIC CIRCUITS**

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

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

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

**REFERENCE BOOKS:**


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

## ELECTRICAL AND ELECTRONIC DEVICES LAB

| **Course** code | 16KUTE1P1 | Credits | 04 | Year | I |
|---|---|---|---|---|---|
| No. of Lecture Hours | -- | No. of Practical Hours | 120 | Sem | I |

**ELECTRICAL MACHINES:**

1. Load test on DC Shunt Generator and estimate of regulation.
2. Load test on DC Shunt Motor.
3. Load test on the given single phase transformer
4. Load test on single phase capacitor start Induction motor.

**ELECTRONIC DEVICES:**

1) Study of i) Types of resistors and its color coding
   ii) Types of inductors
   iii) Types of capacitors
2) Practicing soldering techniques in DOT board.
3) Analysis the VI Characteristic of PN junction Diode in both forward and Reverse biasing.
4) Construct the voltage regulator by using Zener Diode.
5) Construct the simple switching circuit using NPN and PNP transistor.
6) Find out the Characteristics of SCR.
7) Verify the characteristics of MOSFET.
8) Connect the DIAC and determine its Cut in voltage.
9) Connect the TRIAC and determine its gate current for different anode voltage
10) Find out the Characteristic of LED and LDR.

**ELECTRONIC CIRCUITS:**

1. Solder the Bridge Rectifier circuit in DOT board and trace the output waveforms with and without filter.
2. Construct the Diode clipper and trace their output waveform.
3. Construct the Diode Clamper circuit and trace their output waveform.
4. Assemble and analysis of single mode DC regulated power supply.

## OFFICE AUTOMATION

| **Course** code | 16KUGE203 | 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.

**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.

## PROFESSIONAL ENGLISH

| **Course** code | 16KUGE204 | Credits | 04 | Year | I |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical | -- | 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.

## விழுமியக் கல்வி (VALUE EDUCATION)

| **Course** code | 16KUG2VAL | Credits | 04 | Year | I |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical | -- | Sem | II |

**அலகு- I**

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

**அலகு- II**

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

**அலகு - III**

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

**அலகு -IV**

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

**அலகு – V**

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

**குறிப்பு தயாரிக்கப்பட்ட பாடஉரை அளிக்கப்படும்**

## SUPERVISE ASSEMBLY LINE ACTIVITIES

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

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I: SUPERVISOR RESPONSIBILITIES**

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

**UNIT II: SUPERVISORY SKILLS**

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

**UNIT III: HANDLING ELECTRONIC ASSEMBLIES**

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

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

**UNIT IV: ELECTRICAL SAFETY**

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

**UNIT V: TIME MANAGEMENT**

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

**REFERENCE:**


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

## LINEAR INTEGRATED CIRCUITS

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

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I: OPERATIONAL AMPLIFIER**

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

**UNIT II: OPAMP APPLICATIONS**

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

**UNIT III: DIGITAL TO ANALOG CONVERTER**

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

**UNIT IV: ANALOG TO DIGITAL CONVERTER**

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

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

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

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

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

**REFERENCE:**


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

## INTERNSHIP TRAINING-I

| **Course** code | 16KUTE2I1 | Credits | 20 | Year | I |
|---|---|---|---|---|---|
| No. of Lecture Hours | -- | No. of Practical Hours | 1400 | Sem | II |

**OBJECTIVES:**

- To Understand production requirement
- 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.

Students should undergo internship training in an esteemed Electrical and Electronic 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 | 16KUGE305 | Credits | 4 | Year | II |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical Hours | - | Sem | III |

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

**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 (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 | 16KUGE306 | 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 and Operational research

**Unit I:**

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

**Unit II:**

Matrix: Inverse of a matrix – Rank of a matrix – Solution of simultaneous linear equations

**Unit III:**

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

**Unit IV:**

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

**Unit V:**

Linear programming problem – Formation – Solution by Graphical method

**Text Book:**

Business Mathematics and Statistics by PA. Navnitham, Jai Publishers, 2012.

## PRINCIPLES OF MANAGEMENT

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

**OBJECTIVES:**

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

**UNIT I: INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS**

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

**UNITII: PLANNING**

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

**UNIT III: ORGANISING**

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

**UNIT IV: DIRECTING**

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

**UNIT V: CONTROLLING**

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

**TEXT BOOKS:**

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

## DIGITAL ELECTRONICS

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

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I : NUMBER SYSTEMS AND CODES**

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

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

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

**UNIT II: BOOLEAN ALGEBRA AND LOGIC GATES**

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

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

**UNIT III: COMBINATIONAL LOGIC CIRCUITS**

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

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

**UNIT IV: SEQUENTIAL LOGIC CIRCUITS**

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

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

**UNIT V: REGISTERS AND DIGITAL MEMORIES**

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

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

**REFERENCE:**


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


.

## ANALOG AND DIGITAL ELECTRONICS LAB

| **Course** code | 16KUTE3P2 | Credits | 04 | Year | II |
|---|---|---|---|---|---|
| No. of Lecture Hours | -- | No. of Practical Hours | 120 | Sem | III |

**LINEAR INTEGRATED CIRCUITS:**

1. Construct and test Inverting and Non-Inverting Amplifier using operational Amplifier
2. Construct the Scale changer and summing amplifier circuit and test their output by using operational Amplifier.
3. Construct the Astable Multivibrator using IC555 timer.
4. Construct the Monostable Multivibrator using IC555 timer.
5. Construct digital to analog converter(R-2R ladder type).

**DIGITAL ELECTRONICS:**

1. Verify the truth table of the following logic gates AND, OR, NAND, NOT, NOR – using 74XX ICs and bread board.
2. Verification of De-Morgan's theorem.
3. A) Construct the EX-OR Gate by using 2 NOT Gate, 2 AND Gate and 1 OR Gate.
   b) Realization of combinational logic function using AND, OR and NOT gates. Verify the result.
4. Construct the Half adder and full adder using 7408, 7486 and 7432 ICs and verify its truth table.
5. Construct a Half subtractor and Full subtractor and verify the truth table using 74xx ICs.
6. Construct the 4 to 1 multiplexer using logic gates and verify the truth table.
7. Construct the 1 to 4 demultiplexer using logic gates and verify the truth table
8. Design and implementation of encoder and decoder using logic gates and verify the truth table.
9. Construction and verification of truth table for RS, D, T, JK, flip-flop.
10. Construct and verify the performance of a 4 bit binary counter using 7473 ICs

## TECHNICAL DRAWING

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

**Objectives:**

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

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

**Unit I- Introduction to AutoCAD**

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

**Unit II -Text and Dimensioning**

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

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

**Unit III - Geometrical construction**

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

**Unit IV-Projections**

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

**Unit V -Electrical and Electronics Symbols**

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

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

**Text Books:**

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

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

## PROFESSIONAL ETHICS AND HUMAN VALUES

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

**Objectives:**

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

**Unit I: Business Ethics**

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

**Unit II: Managing Ethical Organization**

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

**Unit III: Business ethics in Profession**

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

**Unit IV: Corporate Governance and social responsibility**:

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

**Unit V: Human Values**

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

**Text Book:**

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

## INDIAN VALUES

| **Course** code | 16KUGE410 | Credits | 4 | Year | II |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical Hours | - | Sem | IV |

**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.

**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

## DEVELOP PROCUREMENT SCHEDULE

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

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I: PROCUREMENT**

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

**UNIT II: MANAGING CUSTOMER**

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

**UNIT III: MATERIAL HANDLING**

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

**UNIT IV: MATERIAL MANAGEMENT**

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

**UNIT V: PURCHASING MANAGEMENT**

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

**REFERENCE:**


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

## DEVELOP PRODUCTION PLAN

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

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I: PRODUCTION AND OPERATION MANAGEMENT**

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

**UNIT II: PRODUCTION PLANNING AND CONTROL**

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

**UNIT III: MAN POWER PLANNING**

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

**UNIT IV: MAINTENANCE**

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

**UNIT V: INVENTORY CONTROL**

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

**REFERENCE:**


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

## INTERNSHIP TRAINING-II

| **Course** code | 16KUTE4I2 | Credits | 20 | Year | II |
|---|---|---|---|---|---|
| No. of Lecture Hours | -- | No. of Practical Hours | 1400 | Sem | IV |

**OBJECTIVES:**

- To Derive a procurement chart based on production plan for future months
- To Coordinate with the procurement team
- To Complete documentation
- To develop a good relationship with their co-workers

Students should undergo internship training in an esteemed Electrical and Electronic concern to gain hands on practice and practical industrial exposure.

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

**Tamil-I**

| **Course** code | 16KUGE511 | Credits | 04 | Year | III |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical Hours | -- | Sem | V |

**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. சௌந்திரா கைலாசம் - தெய்வீகம் - வளம்பெற வரம் தருவாள் (சௌந்திரா 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 வளர்சியும்
2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்.

* * * * *

**Mathematics – III**

| **Course** code | 16KUGE512 | Credits | 04 | Year | III |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical Hours | -- | Sem | V |

**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 Striling's formula

**Unit - IV**

**TRIGONOMETRY:** 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 $\theta$ -

**Unit - V**

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

**Text Book:**


1. Numerical methods **by** P.Kandasamy, K.Thilakavathy, K.Gunavathy, 2003 Edition
2. Ancillary Mathematics (Volume I ) by S. Narayanan, R. Hanumantha Rao, Manickavachagam Pillai and P. Kandaswamy, S.Viswanathan (Printers & Publishers) Pvt Ltd., 2007

## Total Quality Management

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

**Unit - I INTRODUCTION**

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

**Unit - II TQM PRINCIPLES**

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

**Unit - III TQM TOOLS & TECHNIQUES I**

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

**Unit - IV TQM TOOLS & TECHNIQUES II**

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

**Unit - V QUALITY SYSTEMS**

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

**TEXT BOOK**


1. Dale H.Besterfiled, et at., "Total Quality Management", Pearson Education Asia, Third Edition, Indian Reprint (2006).

2. Janakiraman,B and Gopal, R.K, "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. L

## MICROPROCESSOR AND MICROCONTROLLER

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

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I: 8085 MICROPROCESSOR**

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

**UNIT II: 8051MICROCONTROLLER**

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

**UNIT III: INSTRUCTIONS I**

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

**UNIT IV: INSTRUCTIONS II**

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

**UNIT V: INTERFACING APPLICATIONS**

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

**REFERENCE:**


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

## MICROPROCESSOR AND MICROCONTROLLER LAB

| **Course** code | 16KUTE5P3 | Credits | 04 | Year | III |
|---|---|---|---|---|---|
| No. of Lecture Hours | -- | No. of Practical Hours | 120 | Sem | V |

**8085 MICROPROCESSOR**

Write an Assembly Language Program to

1. Add two 8 bit numbers using 8085 Microprocessor.
2. Subtract two 8 bit numbers using 8085 Microprocessor
3. Multiply two 8 bit numbers using 8085 Microprocessor
4. Divide two 8 bit numbers using 8085 Microprocessor.

**8051 MICROCONTROLLER**

Write an Assembly Language Program to

1. Addition and Subtraction of two 8 bit numbers using 8051 Microcontroller.
2. Multiplication and Division of two 8 bit numbers using 8051 Microcontroller.
3. Arranging the given data in ascending order.
4. Square Root of a given number.
5. Solve the given Boolean Equation.

**INTERFACING PROGRAMS**

1. Interfacing the 4*4 Key MATRIX with 8279
2. Interfacing push to on switches and relays with 89C51.
3. Interfacing the two Digit Seven segments LED with 8051.
4. Interfacing ADC 0808 with 89C51.
5. Interfacing of the given DC Motor with Microcontroller.
6. Interfacing of stepper Motor with Microcontroller.

## Tamil-II

| **Course** code | 16KUGE614 | Credits | 04 | Year | III |
|---|---|---|---|---|---|
| No. of Lecture Hours | 60 | No. of Practical Hours | -- | Sem | VI |

**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

## Safety Engineering

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

**Unit-I Introduction**

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

**Unit-II Safety prevention**

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

**Unit-III Safety in Material Handling**

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

**Unit-IV Shopfloor Safety**

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

**Unit-V Electrical Safety**

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

**Text Books:**


1. C.Ray Asfahl , *Industrial Safety and Health management,* Pearson Prentice Hall,2003.

2. N.V Krishnan. *Safety Management in Industry* Jaico Publishing House, Bombay, 1997.

## Entrepreneurship Development

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

**Unit I: Entrepreneurship**

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

**Unit II: Institutional Finance to Entrepreneurs**

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

**All Indian Financial Institutions:**

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

**Unit III: Institutional Setup to Entrepreneurs**

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

**Unit IV: Incentives and Subsidies of State and Central Government**

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

**Unit V: Sources of Ideas**

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

**Text Books:**


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

## DEVELOP HARDWARE PRODUCT FOR MANUFACTURING

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

**OBJECTIVES:**

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

**OUTCOMES:**

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

**UNIT I: MATERIAL REQUIREMENT AND SUPPLIER SELECTION**

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

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

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

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

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

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

**UNIT III: ELECTRONIC TESTING EQUIPMENTS**

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

**UNIT IV: FUNDAMENTALS OF TROUBLESHOOTING PROCEDURES**

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

**UNIT V: QUALITY CONTROL AND WASTE MANAGEMENT IN INDUSTRY**

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

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

**REFERENCE:**


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

## PROJECT

| **Course** code | 16KUTE6PR | Credits | 04 | Year | III |
|---|---|---|---|---|---|
| No. of Lecture Hours | -- | No. of Practical Hours | 120 | Sem | VI |

Develop Electronic Hardware working model suitable for real practical environment by implementing the theoretical and practical knowledge gained through the curriculum. Develop the production plan by considering the following parameters

a) Material Requirement

b) Analyze the specification and quantity of required Electronic components

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 | 16KUTE6I3 | Credits | 20 | Year | III |
|---|---|---|---|---|---|
| No. of Lecture Hours | -- | No. of Practical Hours | 1400 | Sem | VI |

**OBJECTIVES:**

- To Understand the work requirement
- To Understand the customer and market requirement
- To Develop product
- To Report and document completion of work
- To Follow quality procedures

Students should undergo internship training in an esteemed Electrical and Electronic 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 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 and practical part includes two components.

| Components | Internal Marks | External Marks | Total Marks |
|---|---|---|---|
| General Component (Theory) | 50 | 50 | 100 |

**Continuous Internal Assessment:**

Two CIA tests conducted for each paper during each semester.

**CIA for General and Skilled component:**

| 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**

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

## QUESTION PAPER PATTERN

1) The question paper pattern and coverage of syllabus for each CIA and External (semester) examinations for Basic English, Mathematics-I, Office Automation, Professional English and Value Education.

**CIA TEST – I**
**(Unit 1 & 2 only)**

**Time: 1 Hour** **Max. Marks: 20**

| | | |
|---|---|---|
| **Part - A** | **No choice**<br>(Five questions from unit 1 & 2) | **5 x 2 = 10** |
| **Part – B** | **Two out of three**<br>(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**<br>(Five questions from unit 3, 4 & 5) | **5 x 2 = 10** |
| **Part – B** | **Answer any Three questions out of Five**<br>(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**<br>(Ten questions from All five units) | **10 x 2 = 20** |
| **Part – B** | **Answer any Five questions out of Eight**<br>(Eight questions from All five units) | **5 x 6 = 30** |

2) The question paper pattern for Environmental Studies will be conducted through online exam for internal Assessment and Semester Examination.

**SCHEME OF EXAMINATION (for Vocational Education Component)**

The question paper pattern and coverage of syllabus for theory and practical will be conducted by **E**lectronics **S**ector **S**kill **C**ouncil **(ESSC)** of **N**ational **S**kill **D**evelopment **C**orporation **(NSDC)**.