



**VEL TECH MULTI TECH**  
**Dr RANGARAJAN Dr.SAKUNTHALA ENGINEERING COLLEGE**

(An ISO 9001: 2000 Certified Institution)  
(Owned by 'VEL Shree R. Rangarajan  
Dr. Sakunthala Rangarajan Educational Academy)

(Approved by AICTE, New Delhi  
&  
Govt. of Tamil Nadu and affiliated to Anna University)



**SYLLABUS**  
**WEEKLY SCHEDULE**

**VII SEMESTER**  
**2013-2014**  
4 Year Degree Course in Engineering  
**MECH**

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S.No	SUBJECT CODE	SUBJECT NAME
1	GE 2022	Total Quality Management
2	ME 2401	Mechatronics
3	ME 2402	Computer Integrated Manufacturing
4	ME 2403	Power Plant Engineering
5	ME 2027	Process Planning & Cost Estimation
6	ME 2034	Nuclear Engineering

### WEEK DETAILS YEAR 2012-2013

S.NO	WEEKS	DATE	
		FROM	TO
1.	WEEK 1	24.06.2013	28.06.2013
2.	WEEK 2	01.07.2013	05.07.2013
3.	WEEK 3	08.07.2013	12.07.2013
4.	WEEK 4	15.07.2013	19.07.2013
5.	WEEK 5	22.07.2013	26.07.2013
6.	WEEK 6	30.07.2013	02.08.2013
7.	WEEK 7	05.08.2013	08.08.2013
8.	WEEK 8	12.08.2013	16.08.2013
9.	WEEK 9	12.08.2013	16.08.2013
10.	WEEK 10	19.08.2013	23.08.2013
11.	WEEK 11	26.08.2013	30.08.2013
12.	WEEK 12	02.09.2013	06.09.2013
13.	WEEK 13	09.09.2013	13.09.2013
14.	WEEK 14	16.09.2013	21.09.2013
15.	WEEK 15	23.09.2013	28.09.2013
16.	WEEK 16	30.09.2013	06.10.2013

### WEEK 4 - NUCLEAR REACTIONS AND REACTION MATERIALS

Mechanism of nuclear fission and fusion- radio activity- chain reactions

### WEEK 5

Critical mass and composition-nuclear fuel cycles and its characteristics-

### WEEK 6

Uranium production and purification-Zirconium, thorium, beryllium

### WEEK 7-CYCLE TEST-1

### WEEK 8 - REPROCESSING

Reprocessing: nuclear fuel cycles-spent fuel characteristics

### WEEK 9

Role of solvent extraction in reprocessing

### WEEK 10

Solvent extraction equipment

### WEEK 11 - NUCLEAR REACTOR

Nuclear reactors: types of fast breeding reactors

### WEEK 12

Design and construction of fast

### WEEK 13 -CYCLE TEST-2

### WEEK 14

Breeding reactors-heat transfer techniques in nuclear reactors- reactor shielding Fusion reactors

### WEEK 15 - SAFETY AND DISPOSAL

Safety and disposal: Nuclear plant safety-safety systems-changes and consequences of accident

### WEEK 16

Criteria for safety-nuclear waste-types of waste and its disposal-radiation hazards and their prevention-weapons proliferation

## WEEK 7-CYCLE TEST-1

### WEEK 8 - INTRODUCTION TO COST ESTIMATION

Objective of cost estimation- costing – cost accounting

### WEEK 9

Classification of cost - Elements of cost

### WEEK 10 - COST ESTIMATION

Types of estimates – methods of estimates

### WEEK 11

Data requirements and sources

### WEEK 12

Collection of cost- allowances in estimation

## WEEK13 - CYCLE TEST 2

### WEEK 14- PRODUCTION COST ESTIMATION

Estimation of material cost, labour cost and over heads

### WEEK 15

Allocation of overheads

### WEEK 16

Estimation for different types of jobs

## ME2034

## NUCLEAR ENGINEERING

### WEEK 1 - NUCLEAR PHYSICS

Nuclear model of an atom-Equivalence of mass and energy

### WEEK 2

Binding- radio activity-half

### WEEK 3

Life - neutron interactions-cross sections

## GE 2022

## TOTAL QUALITY MANAGEMENT

### WEEK: 1 - INTRODUCTION

Introduction - Need for quality - Evolution of quality - Definition of quality

### WEEK: 2

Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM

### WEEK: 3

TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM

### WEEK: 4 - TQM PRINCIPLES

Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints

### WEEK: 5

Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward

### WEEK: 6

Performance appraisal - Continuous process improvement PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating

### WEEK: 7 – (UNIT TEST - I)

### WEEK: 8 - TQM TOOLS & TECHNIQUES I

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, Methodology, applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages and Types

**WEEK: 9 -TQM TOOLS & TECHNIQUES II**

Quality circles – Quality Function Deployment (QFD)

**WEEK: 10**

Taguchi quality loss function

**WEEK: 11**

TPM – Concepts, improvement needs – Cost of Quality

**WEEK: 12**

Performance measures

**WEEK: 13 –CYCLE TEST –II****WEEK: 14 - QUALITY SYSTEMS**

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, and Quality auditing

**WEEK: 15**

QS 9000 – ISO 14000 – Concepts, Requirements and Benefits

**WEEK 16**

Case studies of TQM implementation in manufacturing - Service sectors including IT

**ME 2401****MECHATRONICS****WEEK: I - MECHATRONICS, SENSORS AND TRANSDUCERS**

Mechatronics Systems – Measurement Systems – Control Systems – Microprocessor based Controllers

**WEEK: 2**

Sensors and Transducers – Performance Terminology – Sensors for Displacement, Position and Proximity

**WEEK 12**

Regeneration and intercooling – combines cycle

**WEEK 13 - CYCLE TEST-2****WEEK 14 - OTHER POWER PLANTS AND ECONOMICS OF POWER PLANTS**

Geo thermal- OTEC- tidal- Pumped storage –Solar central receiver system  
Cost of electric Energy fixed and operating costs

**WEEK 15**

Energy rates- Types tariffs

**WEEK 16**

Economics of load sharing, comparison of various power plants

**ME2027****PROCESS PLANNING AND COST ESTIMATION****WEEK 1 - WORK STUDY AND ERGONOMICS**

Method study – Definition – Objectives-Motion economy- Principles – Tools and

**WEEK 2**

Techniques-Applications – Work measurements- purpose – use – procedure

**WEEK 3**

Tools and techniques- Standard time –Ergonomics – principles – applications

**WEEK 4 - PROCESS PLANNING**

Definition – Objective – Scope – approaches to process planning- Process planning activities

**WEEK 5**

Finished part requirements- operating sequences- machine selection – material selection parameters- Set of documents for process planning

**WEEK6**

Developing manufacturing logic and knowledge- production time calculation – selection of cost optimal processes

**WEEK 1 - INTRODUCTION TO POWER PLANTS AND BOILERS**

Layout of Steam, Hydel , Diesel , MHD, Nuclear and Gas turbine Power Plants

**WEEK 2**

Combined Power cycles – comparison and selection , Load duration Curves, Steam

**WEEK 3**

Boilers and cycles – High pressure and Super Critical Boilers –Fluidised Bed Boilers

**WEEK 4 - STEAM POWER PLANT**

Fuel and ash handling, Combustion Equipment for burning coal, Mechanical Stokers.

**WEEK 5**

Pulveriser, Electrostatic Precipitator, Draught- Different Types, Surface condenser types, cooling Towers

**WEEK 6 - NUCLEAR AND HYDEL POWER PLANTS**

Nuclear Energy-Fission, Fusion Reaction, Types of Reactors, Pressurized water reactor, Boiling water reactor, Waste disposal and safety Hydel Power plant

**WEEK 7 - CYCLE TEST-1****WEEK 8**

Essential elements, Selection of turbines, governing of Turbines- Micro hydel developments

**WEEK 9 - DIESEL AND GAS TURBINE POWER PLANTS**

Types of diesel plants, components, Selection of Engine type, applications

**WEEK 10**

Gas turbine power plant- Fuels- Gas turbine material

**WEEK 11**

Open and closed cycles- reheating

**WEEK: 3**

Velocity, Motion, Force, Fluid Pressure, Liquid Flow, Liquid Level, Temperature, Light Sensors – Selection of Sensors

**WEEK: 4 - ACTUATION SYSTEMS**

Pneumatic and Hydraulic Systems – Directional Control Valves – Rotary Actuators, Mechanical Actuation Systems – Cams – Gear Trains – Ratchet and pawl – Belt and Chain Drives – Bearings

**WEEK: 7 CYCLE TEST – I****WEEK 8**

Electrical Actuation Systems – Mechanical Switches – Solid State Switches – Solenoids – Construction and working principle of DC and AC Motors

**WEEK: 9**

Speed control of AC and DC drives, Stepper Motors-switching circuitries for stepper motor – AC & DC Servo motors

**WEEK: 10 - SYSTEM MODELS AND CONTROLLERS**

Building blocks of Mechanical, Electrical, Fluid and Thermal Systems, Rotational – Transnational Systems, Electromechanical Systems – Hydraulic – Mechanical Systems, Continuous and discrete process Controllers – Control Mode – Two – Step mode

**WEEK: 11**

Proportional Mode – Derivative Mode – Integral Mode – PID Controllers – Digital Controllers – Velocity Control

**WEEK: 12**

Adaptive Control – Digital Logic Control – Micro Processors Control

**WEEK: 13 - CYCLE TEST-2****WEEK: 14 – PROGRAMMING LOGIC CONTROLLERS**

Programmable Logic Controllers – Basic Structure – Input / Output Processing – Programming – Mnemonics

Timers, Internal relays and counters – Shift Registers – Master and Jump Controls  
– Data Handling – Analogs Input / Output – Selection of a PLC

### **WEEK: 15 - DESIGN OF MECHATRONICS SYSTEM**

Stages in designing Mechatronics Systems – Traditional and Mechatronic  
Design -Possible Design Solutions, Case studies of Mechatronics systems- Pick and  
place

### **WEEK: 16**

Robot- Autonomous mobile robot-Wireless surveillance balloon- Engine  
Management system- Automatic car park barrier

## **ME2402      COMPUTER INTEGRATED MANUFACTURING**

### **WEEK 1 - COMPUTER AIDED DESIGN**

Concept of CAD as drafting and designing facility, desirable features of  
CAD package, drawing features in CAD – Scaling, rotation, translation, editing,  
dimensioning, labeling

### **WEEK 2**

Zoom, pan, redraw and regenerate, typical CAD command structure, wire  
frame modeling

### **WEEK 3**

Surface modeling and solid modeling (concepts only) in relation to popular  
CAD packages

### **WEEK 4 - COMPONENTS OF CIM**

CIM as a concept and a technology, CASA/Sme model of CIM, CIM II,  
benefits of CIM,communication matrix in CIM, fundamentals of computer  
communication in CIM – CIM data transmission methods – serial, parallel,  
asynchronous, synchronous, modulation,demodulation, simplex and duplex

### **WEEK 5**

Types of communication in CIM – point to point (PTP), star and  
multiplexing, Computer networking in CIM – the seven layer OSI model,  
LAN model, MAP model, network topologies – star, ring and bus, advantages of  
networks in CIM

### **WEEK 6 - GROUP TECHNOLOGY AND COMPUTER AIDED PROCESS PLANNING**

History Of Group Technology – role of G.T in CAD/CAM Integration –  
part families' classification and coding

### **WEEK 7-CYCLE TEST-1**

### **WEEK 8**

DCLASS and MCLASS and OPTIZ coding systems – facility design using  
G.T – benefits of G.T – cellular manufacturing, Process planning - role of process  
planning in CAD/CAM Integration

### **WEEK 9**

Approaches to computer aided process planning – variant approach and  
generative approaches – CAPP and CMPP systems.

### **WEEK 10 - SHOP FLOOR CONTROL AND INTRODUCTION TO FMS**

Shop floor control – phases – factory data collection system – automatic  
identification methods – Bar code technology – automated data collection system.

### **WEEK 11**

FMS – components of FMS – types – FMS workstation – material handling  
and storage system

### **WEEK 12**

FMS layout- computer control systems, applications and benefits

### **WEEK 13- CYCLE TEST-2**

### **WEEK 14 - COMPUTER AIDED PLANNING AND CONTROL AND COMPUTER MONITORING**

Production planning and control – cost planning and control – inventory  
management material requirements planning (MRP) – shop floor control. Lean and  
Agile Manufacturing

### **WEEK 15**

Types of production monitoring systems – structure model of  
manufacturing – process control and strategies – direct digital control