



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

(An ISO 9001: 2008 Certified Institution)

(Owned by Vel Trust)

(Approved by Govt. of Tamil Nadu and affiliated to Anna University)



SYLLABUS

WEEKLY SCHEDULE

VII SEMESTER

2014 - 2015

DEPARTMENT OF MECHANICAL ENGINEERING

IV YEAR DEGREE COURSE

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WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	WEEK1	24-06-2014	27-06-2014
2	WEEK2	30-06-2014	04-07-2014
3	WEEK3	07-07-2014	11-07-2014
4	WEEK4	14-07-2014	18-07-2014
5	WEEK5	21-07-2014	25-07-2014
6	WEEK6	28-07-2014	01-08-2014
7	WEEK7	04-08-2014	08-08-2014
8	WEEK8	11-08-2014	14-08-2014
9	WEEK9	18-08-2014	22-08-2014
10	WEEK10	25-08-2014	28-08-2014
11	WEEK11	01-09-2014	05-09-2014
12	WEEK12	08-09-2014	12-09-2014
13	WEEK13	15-09-2014	19-09-2014
14	WEEK14	22-09-2014	26-09-2014
15	WEEK15	29-09-2014	01-10-2014
16	WEEK16	06-10-2014	10-10-2014
17	WEEK17	13-10-2014	17-10-2014
18	WEEK18	20-10-2014	24-10-2014
19	WEEK19	27-10-2014	31-10-2014

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	GE 2022	Total Quality Management
2	ME 2401	Mechatronics
3	ME 2402	Computer Integrated Manufacturing
4	ME 2403	Power Plant Engineering
5	ME2027	Process planning and cost estimation
6	ME2034	Nuclear Engineering
PRACTICAL		
7	ME2404	Computer Aided Simulation & Analysis Lab
8	ME2405	Mechatronics Lab

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	UNIT TEST III	UNIT TEST IV	UNIT TEST V
1	GE 2022	Total Quality Management	08/07/14 FN	30/07/14 FN	20/08/14 FN	09/09/14 FN	29/09/14 FN
2	ME 2401	Mechatronics	08/07/14 AN	30/07/14 AN	20/08/14 AN	09/09/14 AN	29/09/14 AN
3	ME 2402	Computer Integrated Manufacturing	09/07/14 FN	31/07/14 FN	21/08/14 FN	10/09/14 FN	30/09/14 FN
4	ME 2403	Power Plant Engineering	09/07/14 AN	31/07/14 AN	21/08/14 AN	10/09/14 AN	30/09/14 AN
5	ME2027	Process planning and cost estimation	10/07/14 FN	01/08/14 FN	22/08/14 FN	11/09/14 FN	01/10/14 FN
6	ME2034	Nuclear Engineering	10/07/14 AN	01/08/14 AN	22/08/14 AN	11/09/14 AN	01/10/14 AN

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	GE 2022	Total Quality Management	13-10-2014
2	ME 2401	Mechatronics	14-10-2014
3	ME 2402	Computer Integrated Manufacturing	15-10-2014
4	ME 2403	Power Plant Engineering	16-10-2014
5	ME2027	Process planning and cost estimation	17-10-2014
6	ME2034	Nuclear Engineering	20-10-2014

GE 2022 TOTAL QUALITY MANAGEMENT

WEEK: 1 –

UNIT I: 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 UNIT TEST-I

UNIT II: TQM PRINCIPLES

Leadership – Strategic quality planning, Quality statements -
Customer focus – Customer orientation, Customer satisfaction,
Customer complaints retention - Employee involvement – Motivation,
Empowerment, Team and Teamwork,

WEEK: 5

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

WEEK: 6 UNIT TEST-II

WEEK: 7

UNIT III: TQM TOOLS & TECHNIQUES I

The seven traditional tools of quality – New management tools –
Six-sigma: Concepts,

WEEK: 8

Methodology, applications to manufacturing, service sector including
IT

WEEK: 9

Bench marking – Reason to bench mark, Bench marking process –
FMEA – Stages and Types

WEEK: 10 UNIT TEST-III

UNIT IV: TQM TOOLS & TECHNIQUES

Quality circles – Quality Function Deployment (QFD)

WEEK: 11

Taguchi quality loss function - TPM – Concepts, improvement needs

WEEK: 12

Cost of Quality - Performance measures

WEEK: 13 –UNIT TEST-IV

WEEK: 14 REVISION 1- 4 UNITS

WEEK: 15

UNIT V: QUALITY SYSTEMS

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, and Quality auditing - QS 9000 – ISO 14000 – Concepts, Requirements and Benefits

WEEK 16

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

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

ME 2401 MECHATRONICS

WEEK: I

UNIT 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: 3

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

WEEK: 4 UNIT TEST-I

UNIT II: ACTUATION SYSTEMS

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

WEEK: 5

Two – Step mode – Proportional Mode – Derivative Mode – Integral Mode – PID Controllers – Digital Controllers – Velocity Control – Adaptive Control – Digital Logic Control – Micro Processors Control.

WEEK: 6 UNIT TEST-II

WEEK: 7

UNIT III SYSTEM MODELS AND CONTROLLERS

Building blocks of Mechanical, Electrical, Fluid and Thermal Systems, Rotational – Transnational Systems, Electromechanical

WEEK 8

Systems – Hydraulic – Mechanical Systems. Continuous and discrete process Controllers

WEEK: 9

Control Mode – Two – Step mode – Proportional Mode – Derivative Mode – Integral Mode – PID Controllers – Digital Controllers – Velocity Control – Adaptive Control – Digital Logic Control – Micro Processors Control.

WEEK: 10 UNIT TEST-III

UNIT IV PROGRAMMING LOGIC CONTROLLERS

Programmable Logic Controllers – Basic Structure – Input / Output Processing

WEEK: 11

Programming – Mnemonics – Timers, Internal relays and counters – Shift Registers – Master and Jump Controls –

WEEK: 12

Data Handling – Analogs Input / Output – Selection of a PLC.

WEEK: 13 UNIT TEST-IV**WEEK: 14 REVISION 1-4 UNITS****WEEK: 15****UNIT V: 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 surivellance balloon- Engine Management system- Automatic car park barrier

WEEK-17- UNIT TEST V**WEEK-18- MODEL EXAM****ME2402 COMPUTER INTEGRATED
MANUFACTURING****WEEK 1****UNIT I: 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 UNIT TEST-I

UNIT II: 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 - UNIT TEST-II

WEEK 7

UNIT III: 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 8

DCLASS and MCLASS and OPTIZ coding systems – facility design using G.T – benefits of G.T – cellular manufacturing,

WEEK 9

Process planning - role of process planning in CAD/CAM Integration - Approaches to computer aided process planning – variant approach and generative approaches – CAPP and CMPP systems.

WEEK 10 UNIT TEST-III

UNIT IV: 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 UNIT TEST-IV

WEEK 14 REVISION 1-4 UNITS

WEEK 15

UNIT V: 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 16

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

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

ME2403 POWER PLANT ENGINEERING

WEEK 1

UNIT I: 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

UNIT II : 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 – CYCLE TEST-1

WEEK 7 - CYCLE TEST-1

WEEK 8

UNIT III: 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 9

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

WEEK 10

UNIT IV: DIESEL AND GAS TURBINE POWER PLANTS

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

WEEK 11

Gas turbine power plant- Fuels- Gas turbine material
Open and closed cycles- reheating

WEEK 12

Regeneration and intercooling – combines cycle

WEEK 13 - CYCLE TEST-2

WEEK 14 REVISION 1-4 UNITS

WEEK 15

UNIT V: 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 16

Energy rates- Types tariffs - Economics of load sharing, comparison of various power plants

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

ME2027 PROCESS PLANNING AND COST ESTIMATION

WEEK 1

UNIT I: WORK STUDY AND ERGONOMICS

Method study – Definition – Objectives

WEEK 2

Motion economy - Principles – Tools and Techniques- Applications –

WEEK 3

Work measurements- purpose – use – procedure - Tools and techniques- Standard time –Ergonomics – principles – applications

WEEK 4

UNIT II: PROCESS PLANNING

Definition – Objective – Scope – approaches to process planning- Process planning activities - Finished part requirements- operating sequences

WEEK 5

Machine selection – material selection parameters- Set of documents for process planning - Developing manufacturing logic and knowledge- production time calculation – selection of cost optimal processes

WEEK6 CYCLE TEST I

WEEK 7-CYCLE TEST-1

WEEK 8 –

UNIT III: INTRODUCTION TO COST ESTIMATION

Objective of cost estimation- costing – cost accounting

WEEK 9

Classification of cost - Elements of cost

WEEK 10

UNIT IV: 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: REVISION 1-4 UNITS

WEEK 15

UNIT V: PRODUCTION COST ESTIMATION

Estimation of material cost, labour cost and over heads

WEEK 16

Allocation of overheads - Estimation for different types of jobs

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

ME2034 NUCLEAR ENGINEERING

WEEK 1 –

UNIT I: 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

WEEK 4 –

UNIT II: 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- Uranium production and purification-Zirconium, thorium, beryllium

WEEK 6 CYCLE TEST-1

WEEK 7-CYCLE TEST-1

WEEK 8

UNIT III: REPROCESSING

Reprocessing: nuclear fuel cycles-spent fuel characteristics

WEEK 9

Role of solvent extraction in reprocessing - Solvent extraction equipment

WEEK 10

UNIT IV: NUCLEAR REACTOR

Nuclear reactors: types of fast breeding reactors

WEEK 11 -

Design and construction of fast breeding reactors-heat transfer techniques in nuclear reactors

WEEK 12

Reactor shielding. Fusion reactors

WEEK 13 CYCLE TEST-2

WEEK 14 REVISION 1-4 UNITS

WEEK 15 –

UNIT V: 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-17- UNIT TEST V

WEEK-18- MODEL EXAM