



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

(An ISO 9001: 2008 Certified Institution)

(Owned by Vel Trust)

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



SYLLABUS

WEEKLY SCHEDULE

III 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	08-04-2014
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	MA6351	Transforms and Partial Differential Equations
2	CE6402	Strength of Materials
3	ME6301	Engineering Thermodynamics
4	CE6451	Fluid Mechanics and Machinery
5	ME6302	Manufacturing Technology - I
6	EE6351	Electrical Drives and Controls
PRACTICAL		
7	ME6311	Manufacturing Technology Laboratory - I
8	CE6461	Fluid Mechanics and Machinery Laboratory
9	EE6365	Electrical Engineering Laboratory

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	MA6351	Transforms and Partial Differential Equations	08/07/14 FN	30/07/14 FN	20/08/14 FN	09/09/14 FN	29/09/14 FN
2	CE6402	Strength of Materials	08/07/14 AN	30/07/14 AN	20/08/14 AN	09/09/14 AN	29/09/14 AN
3	ME6301	Engineering Thermodynamics	09/07/14 FN	31/07/14 FN	21/08/14 FN	10/09/14 FN	30/09/14 FN
4	CE6451	Fluid Mechanics and Machinery	09/07/14 AN	31/07/14 AN	21/08/14 AN	10/09/14 AN	30/09/14 AN
5	ME6302	Manufacturing Technology - I	10/07/14 FN	01/08/14 FN	22/08/14 FN	11/09/14 FN	01/10/14 FN
6	EE6351	Electrical Drives and Controls	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	MA6351	Transforms and Partial Differential Equations	13-10-2014
2	CE6402	Strength of Materials	14-10-2014
3	ME6301	Engineering Thermodynamics	15-10-2014
4	CE6451	Fluid Mechanics and Machinery	16-10-2014
5	ME6302	Manufacturing Technology - I	17-10-2014
6	EE6351	Electrical Drives and Controls	20-10-2014

MA6351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

WEEK 1

Unit I: PARTIAL DIFFERENTIAL EQUATIONS

Formation of partial differential equations – Singular integrals --

WEEK2 Solutions of standard types of first order partial differential equations - Lagrange's linear equation

WEEK 3

Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types

WEEK 4 UNIT TEST-I

UNIT II FOURIER SERIES

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series –

WEEK 5

Half range cosine series – Complex form of Fourier series – Parseval's identity – Harmonic analysis.

WEEK 6 UNIT TEST-II

WEEK 7 UNIT III APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS

Classification of PDE

WEEK 8

– Method of separation of variables - Solutions of one dimensional wave equation –

WEEK 9

One dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction (excluding insulated edges).

WEEK 10 UNIT TEST-III

UNIT IV FOURIER TRANSFORMS

Statement of Fourier integral theorem – Fourier transform pair –
Fourier sine and cosine transforms – Properties

WEEK 11

Transforms of simple functions

WEEK 12

Convolution theorem – Parseval's identity.

WEEK 13 - UNIT TEST-IV

WEEK -14 REVISION 1-4 UNITS

WEEK -15

UNIT V Z - TRANSFORMS AND DIFFERENCE EQUATIONS

Z- transforms - Elementary properties – Inverse Z - transform (using
partial fraction and residues)

WEEK -16

Convolution theorem - Formation of difference equations – Solution of
difference equations using Z - transform

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

CE6402 STRENGTH OF MATERIALS

WEEK 1

UNIT I ENERGY PRINCIPLES

Strain energy and strain energy density – strain energy due to axial load, shear, flexure and torsion –

WEEK 2

Castigliano's theorems – Maxwell's reciprocal theorems - Principle of virtual work –

WEEK 3 UNIT TEST-I

application of energy theorems for computing deflections in beams and trusses - Williot Mohr's Diagram.

WEEK 4

UNIT II INDETERMINATE BEAMS

Concept of Analysis - Propped cantilever and fixed beams-fixed end moments and reactions –

WEEK 5

Theorem of three moments – analysis of continuous beams – shear force and bending moment diagrams.

WEEK 6 UNIT TEST-II

WEEK 7 UNIT III COLUMNS AND CYLINDER

Euler's theory of long columns – critical loads for prismatic columns with different end conditions

WEEK 8

Rankine-Gordon formula for eccentrically loaded columns

WEEK -9

Eccentrically loaded short columns – middle third rule – core section – Thick cylinders – Compound cylinders.

WEEK 10 UNIT TEST-III

UNIT IV STATE OF STRESS IN THREE DIMENSIONS

Determination of principal stresses and principal planes – Volumetric strain

WEEK 11

Theories of failure –

WEEK 12

Principal stress - Principal strain – shear stress – Strain energy and distortion energy theories – application in analysis of stress, load carrying capacity.

WEEK 13 - UNIT TEST-IV

WEEK 14 REVISION 1-4 UNITS

WEEK 15

UNIT V ADVANCED TOPICS IN BENDING OF BEAMS

Unsymmetrical bending of beams of symmetrical and unsymmetrical sections –

WEEK 16

Shear Centre - curved beams – Winkler Bach formula.

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

ME6301 ENGINEERING THERMODYNAMICS

WEEK 1 UNIT I

BASIC CONCEPTS AND FIRST LAW Basic concepts - concept of continuum, comparison of microscopic and macroscopic approach. Path and point functions. Intensive and extensive, total and specific quantities.

WEEK 2 System and their types. Thermodynamic Equilibrium State, path and process. Quasi-static, reversible and irreversible processes. Heat and work transfer, definition and comparison, sign convention.

WEEK 3

Displacement work and other modes of work .P-V diagram. Zeroth law of thermodynamics – concept of temperature and thermal equilibrium–relationship between temperature scales –new temperature scales. First law of thermodynamics –application to closed and open systems – steady and unsteady flow processes.

WEEK 4 UNIT TEST-I

UNIT II SECOND LAW AND AVAILABILITY ANALYSIS 9

Heat Reservoir, source and sink. Heat Engine, Refrigerator, Heat pump. Statements of second law and its corollaries. Carnot cycle Reversed Carnot cycle, Performance. Clausius inequality. Concept of entropy, T-s diagram, Tds Equations, entropy change for - pure

substance, ideal gases - different processes, principle of increase in entropy.

WEEK 2 Applications of II Law. High and low grade energy. Available and non-available energy of a source and finite body. Energy and irreversibility. Expressions for the energy of a closed system and open systems. Energy balance and entropy generation. Irreversibility. I and II law Efficiency.

WEEK 6 UNIT TEST-II

WEEK 7 UNIT III PROPERTIES OF PURE SUBSTANCE AND STEAM POWER CYCLE

Formation of steam and its thermodynamic properties, p-v, p-T, T-v, T-s, h-s diagrams. p-v-T surface

WEEK 8

. Use of Steam Table and Mollier Chart. Determination of dryness fraction. Application of I and II law for pure substances.

WEEK 9

Ideal and actual Rankine cycles, Cycle Improvement Methods - Reheat and Regenerative cycles, Economiser, preheater, Binary and Combined cycles.

WEEK 10 UNIT TEST-III

UNIT IV IDEAL AND REAL GASES, THERMODYNAMIC RELATIONS Properties of Ideal gas- Ideal and real gas comparison- Equations of state for ideal and real gases-Reduced properties-.Compressibility factor-.Principle of Corresponding states. –

WEEK 11

Generalised Compressibility Chart and its use-. Maxwell relations, Tds Equations, Difference and ratio of heat capacities, Energy equation, Joule-Thomson Coefficient,

WEEK 12

Clausius Clapeyron equation, Phase Change Processes. Simple Calculations.

WEEK 13 UNIT TEST-IV

WEEK 14 REVISION 1-4 UNITS

WEEK 15

UNIT V GAS MIXTURES AND PSYCHROMETRY 9 Mole and Mass fraction, Dalton's and Amagat's Law. Properties of gas mixture – Molar mass, gas constant, density, change in internal energy, enthalpy, entropy and Gibbs function. Psychrometric properties, Psychrometric charts.

WEEK 16

Property calculations of air vapour mixtures by using chart and expressions. Psychrometric process – adiabatic saturation, sensible heating and cooling, humidification, dehumidification, evaporative cooling and adiabatic mixing. Simple Applications

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

CE6451 FLUID MECHANICS AND MACHINERY

WEEK 1

UNIT I

FLUID PROPERTIES AND FLOW CHARACTERISTICS

Units and dimensions- Properties of fluids- mass density, specific weight, specific volume, specific gravity,

WEEK 2

viscosity, compressibility, vapor pressure, surface tension and capillarity. Flow characteristics – concept of control volume –

WEEK 3

application of continuity equation, energy equation and momentum equation.

WEEK 4 UNIT TEST-I

UNIT II FLOW THROUGH CIRCULAR CONDUITS

Hydraulic and energy gradient - Laminar flow through circular conduits and circular annuli-Boundary layer concepts – types of boundary layer thickness –

WEEK 5

Darcy Weisbach equation –friction factor- Moody diagram-commercial pipes- minor losses – Flow through pipes in series and parallel.

WEEK 6 UNIT TEST-II

WEEK 7 UNIT III DIMENSIONAL ANALYSIS

Need for dimensional analysis

WEEK 8

Methods of dimensional analysis – Similitude –types of similitude

WEEK 9

Dimensionless parameters- application of dimensionless parameters – Model analysis.

WEEK 10 UNIT TEST-III

UNIT IV PUMPS

Impact of jets - Euler's equation - Theory of roto-dynamic machines – various efficiencies–

WEEK 11

velocity components at entry and exit of the rotor- velocity triangles - Centrifugal pumps–

WEEK 12

working principle - work done by the impeller - performance curves - Reciprocating pump- working principle – Rotary pumps – classification.

WEEK 13 - UNIT TEST-IV

WEEK 14 REVISION 1-4 UNITS

WEEK 15

UNIT V TURBINES

Classification of turbines – heads and efficiencies – velocity triangles. Axial, radial and mixed flow turbines. Pelton wheel, Francis turbine and Kaplan turbines- working principles –

WEEK 16

work done by water on the runner – draft tube. Specific speed - unit quantities – performance curves for turbines –governing of turbines.

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

ME6302 MANUFACTURING TECHNOLOGY – I

WEEK 1

UNIT I METAL CASTING PROCESSES 9 **Sand Casting** : Sand Mould – Type of patterns - Pattern Materials – Pattern allowances –

WEEK 2

Moulding sand Properties and testing – Cores –Types and applications – Moulding machines– Types and applications; **Melting furnaces** : Blast and Cupola Furnaces;

WEEK 3

Principle of special casting processes : Shell - investment – Ceramic mould – Pressure die casting - Centrifugal Casting - CO₂ process – Stir casting; Defects in Sand casting 36

WEEK 4 UNIT TEST-I

UNIT II JOINING PROCESSES

Operating principle, basic equipment, merits and applications of : Fusion welding processes : Gas welding - Types – Flame characteristics; Manual metal arc welding –

WEEK 5

Gas Tungsten arc welding - Gas metal arc welding – Submerged arc welding – Electro slag welding; **Operating principle and applications of** : Resistance welding - Plasma arc welding – Thermit welding – Electron beam welding – Friction welding and Friction Stir Welding; Brazing and soldering; **Weld defects**: types, causes and cure.

WEEK 6 UNIT TEST-II

WEEK 7 UNIT III METAL FORMING PROCESSES Hot working and cold working of metals –

WEEK 8

Forging processes – Open, impression and closed die forging – forging operations.

WEEK 9

Rolling of metals– Types of Rolling – Flat strip rolling – shape rolling operations – Defects in rolled parts. Principle of rod and wire drawing – Tube drawing – Principles of Extrusion – Types – Hot and Cold extrusion.

WEEK 10 UNIT TEST-III

UNIT IV SHEET METAL PROCESSES

Sheet metal characteristics – shearing, bending and drawing operations
– Stretch forming operations

WEEK 11

Formability of sheet metal – Test methods –special forming processes-
Working principle and applications –

WEEK 12

Hydro forming – Rubber pad forming – Metal spinning– Introduction
of Explosive forming, magnetic pulse forming, peen forming, Super
plastic forming – Micro forming

WEEK 13 - UNIT TEST-IV

WEEK 14 REVISION 1-4 UNITS

WEEK 15

UNIT V MANUFACTURE OF PLASTIC COMPONENTS

Types and characteristics of plastics – Moulding of thermoplastics –
working principles and typical applications – injection moulding –
Plunger and screw machines – Compression moulding, Transfer
Moulding –

WEEK 16

Typical industrial applications – introduction to blow moulding –
Rotational moulding – Film blowing – Extrusion – Thermoforming –
Bonding of Thermoplastics.

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

ME6351 ELECTRICAL DRIVES AND CONTROLS

WEEK 1

UNIT I INTRODUCTION Basic Elements – Types of Electric Drives
– factors influencing the choice of electrical drives –

WEEK 2

heating and cooling curves – Loading conditions and classes of duty –

WEEK 3

Selection of power rating for drive motors with regard to thermal overloading and Load variation factors

WEEK 4 UNIT TEST-I

UNIT II DRIVE MOTOR CHARACTERISTICS Mechanical characteristics – Speed-Torque characteristics of various types of load and drive motors –

WEEK 5

Braking of Electrical motors – DC motors: Shunt, series and compound - single phase and three phase induction motors.

WEEK 6 UNIT TEST-II

WEEK 7 UNIT III STARTING METHODS

Types of D.C Motor starters –

WEEK 8

Typical control circuits for shunt and series motors –

WEEK 9

Three phase squirrel cage and slip ring induction motors.

WEEK 10 UNIT TEST-III

UNIT IV CONVENTIONAL AND SOLID STATE SPEED CONTROL OF D.C. DRIVES Speed control of DC series and shunt motors –

WEEK 11

Armature and field control, Ward-Leonard control system –

WEEK 12

Using controlled rectifiers and DC choppers –applications.

WEEK 13 - UNIT TEST-IV

WEEK 14 REVISION 1-4 UNITS

WEEK 15

UNIT V CONVENTIONAL AND SOLID STATE SPEED CONTROL OF A.C. DRIVES 10 Speed control of three phase induction motor – Voltage control, voltage / frequency control, slip power recovery scheme – Using inverters and AC voltage regulators – applications.

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM