



VEL TECH MULTI TECH
Dr RANGARAJAN Dr.SAKUNTHALA ENGINEERING COLLEGE



(An ISO 9001: 2008 Certified Institution)
(Owned by 'VEL Shree R. Rangarajan
Dr. Sagunthala Rangarajan Educational Academy)

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



SYLLABUS WEEKLY SCHEDULE

III SEMESTER 2013-2014

4 Year Degree Course in Engineering

MECH

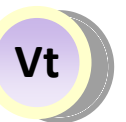
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III SEMESTER CONTENTS

Sl.NO	SUBJECT CODE	SUBJECT NAME
01	MA 2211	Transforms And Partial Differential Equation
02	ME 2201	Manufacturing Technology – I
03	ME 2202	Engineering Thermodynamics
04	ME 2203	Kinematics of Machinery
05	ME 2204	Fluid Mechanics and Machinery
06	ME 2205	Electrical Drives and Control

WEEK DETAILS YEAR 2012-2013

S.NO	WEEKS	DATE	
		FROM	TO
1.	WEEK 1	08.07.2013	13.07.2013
2.	WEEK 2	15.07.2013	19.07.2013
3.	WEEK 3	22.07.2013	27.07.2013
4.	WEEK 4	29.07.2013	03.08.2013
5.	WEEK 5	05.08.2013	10.08.2013
6.	WEEK 6	12.08.2013	17.08.2013
7.	WEEK 7	19.08.2013	24.08.2013
8.	WEEK 8	26.08.2013	31.08.2013
9.	WEEK 9	02.09.2013	07.09.2013
10.	WEEK 10	10.09.2013	14.09.2013
11.	WEEK 11	16.09.2013	21.09.2013
12.	WEEK 12	23.09.2013	28.09.2013
13.	WEEK 13	30.09.2013	05.10.2013
14.	WEEK 14	07.10.2013	11.10.2013
15.	WEEK 15	15.10.2013	19.10.2013
16.	WEEK 16	21.10.2013	26.10.2013

WEEK 5

Characteristics of various types of load and drive motors

WEEK 6

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

WEEK 7 CYCLE TEST I

WEEK 8

UNIT III STARTING METHODS

Types of D.C Motor starters – Typical control circuits for shunt and series motors

WEEK 9

Three phase squirrel cage and slip ring induction motors

WEEK 10

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

WEEK 12

Leonard control system - Using controlled rectifiers and DC choppers – applications

WEEK 13 CYCLE TEST II

WEEK 14

UNIT V - CONVENTIONAL AND SOLID STATE SPEED CONTROL OF A.C. DRIVES

Speed control of three phase induction motor – Voltage control, voltage / frequency control

WEEK 15

Slip power recovery scheme – Using inverters and AC voltage regulators

WEEK-16

Applications

WEEK 10**UNIT IV ROTO DYNAMIC MACHINES**

Homologous units Specific speed Elementary cascade theory Theory of turbo machines Euler's equation

WEEK 11

Hydraulic efficiency Velocity components at the entry and exit of the rotor

WEEK 12

Velocity triangle for single stage radial flow and axial flow machines Centrifugal pumps, turbines, performance curves for pumps and turbines.

WEEK 13 CYCLE TEST II**WEEK 14****UNIT V POSITIVE DISPLACEMENT MACHINES**

Reciprocating pumps, Indicator diagrams, Work saved by air vessels.

WEEK 15

Rotary pumps. Classification

WEEK-16

Rotary pumps - Working and performance curves

ME 2205 - 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 II DRIVE MOTOR CHARACTERISTICS**

Mechanical characteristics – Speed-Torque

MA 2211 - TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATION**WEEK 1****UNIT I****FOURIER SERIES**

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

WEEK 2

Half range sine series – Half range cosine series –

WEEK 3

Complex form of Fourier Series – Parseval's identify – Harmonic Analysis.

WEEK 4**UNIT II****FOURIER TRANSFORMS**

Fourier integral theorem (without proof) – Fourier transform pair

WEEK 5

Sine and Cosine transforms – Properties – Transforms of simple functions

WEEK 6

Convolution theorem – Parseval's identity

WEEK 7 CYCLE TEST I**WEEK 8****UNIT III****PARTIAL DIFFERENTIAL EQUATIONS**

Formation of partial differential equations – Lagrange's linear equation – Solutions of standard types of first order partial differential equations

WEEK 9

Linear partial differential equations of second and higher order with constant coefficients

WEEK 10**UNIT IV- APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS**

Solutions of one dimensional wave equation

WEEK 11

One dimensional equation of heat conduction

WEEK 12

Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in cartesian coordinates

WEEK 13 CYCLE TEST II

WEEK 14

UNIT V Z -TRANSFORMS AND DIFFERENCE EQUATIONS

Z-transforms - Elementary properties – Inverse Z-transform – Convolution theorem

WEEK 15

Formation of difference equations

WEEK-16

Solution of difference equations using Z-transform

ME 2201 MANUFACTURING TECHNOLOGY – I

WEEK 1

UNIT I - METAL CASTING PROCESSES

Sand casting – Sand moulds - Type of patterns – Pattern materials – Pattern allowances – Types of Moulding sand – Properties – Core making

WEEK 2

Methods of Sand testing – Moulding machines – Types of moulding machines - Melting furnaces – Working principle of Special casting processes – Shell, investment casting – Ceramic mould

WEEK 3

Lost Wax process – Pressure die casting – Centrifugal casting – CO₂ process – Sand Casting defects – Inspection methods

WEEK 4

UNIT II - JOINING PROCESSES

Fusion welding processes – Types of Gas welding – Equipments used – Flame characteristics – Filler and Flux materials - Arc welding equipments - Electrodes – Coating and specifications – Principles of Resistance welding – Spot/butt, seam welding – Percussion welding

WEEK 5

Gas metal arc welding – Flux cored – Submerged arc welding – Electro slag welding – TIG welding – Principle and application of special welding processes - Plasma arc welding

WEEK 14

UNIT V FRICTION

Dry friction – Friction in screw jack – Pivot and collar friction - Plate clutches

WEEK 15

Belt and rope drives - Block brakes

WEEK-16

Band brakes

ME 2204 - FLUID MECHANICS AND MACHINERY

WEEK 1

UNIT I INTRODUCTION

Properties of fluids – Specific gravity, specific weight, viscosity, compressibility, vapour pressure and gas laws

WEEK 2

Capillarity and surface tension flow characteristics: concepts of system and control volume. Application of control volume to continuity equation

WEEK 3

Energy equation, momentum equation and moment of momentum equation

WEEK 4

UNIT II FLOW THROUGH CIRCULAR CONDUITS

Laminar flow through circular conduits and circular annuli. Boundary layer concepts Boundary

WEEK 5

Layer thickness. Hydraulic and energy gradient Darcy

WEEK 6

Weisbach equation. Friction factor and Moody diagram. Commercial pipes. Minor losses. Flow through pipes in series and in parallel.

WEEK 7 CYCLE TEST I

WEEK 8

UNIT III DIMENSIONAL ANALYSIS

Dimension and units: Buckingham's II theorem. Discussion on dimensionless parameters

WEEK 9

Models and similitude Applications of dimensionless parameters

WEEK 2

Mobility - Kutzbach criterion (Gruebler's equation) -Grashoff's law- Kinematic Inversions of four-bar chain and slider crank chain - Mechanical Advantage-Transmission angle Description of common Mechanisms

WEEK 3

Offset slider mechanism as quick return mechanisms, Pantograph, Straight line generators (Peaucellier and Watt mechanisms), Steering gear for automobile, Hooke's joint, Toggle mechanism, Ratchets and escapements - Indexing Mechanisms

WEEK 4**UNIT II KINEMATIC ANALYSIS**

Analysis of simple mechanisms (Single slider crank mechanism and four bar mechanism)

WEEK 5

Graphical Methods for displacement, velocity and acceleration; Shaping machine mechanism - Coincident points

WEEK 6

Coriolis acceleration - Analytical method of analysis of slider crank mechanism and four bar mechanism. Approximate analytical expression for displacement, velocity and acceleration of piston of reciprocating engine mechanism

WEEK 7 CYCLE TEST I**WEEK 8****UNIT III KINEMATICS OF CAMS**

Classifications - Displacement diagrams - Parabolic, Simple harmonic and Cycloidal motions

WEEK 9

Graphical construction of displacement diagrams and layout of plate cam profiles - circular arc and tangent cams - Pressure angle and undercutting

WEEK 10**UNIT IV GEARS**

Classification of gears – Gear tooth terminology - Fundamental Law of toothed gearing and involute gearing

WEEK 11

Length of path of contact and contact ratio

WEEK 12

Interference and undercutting - Gear trains – Simple, compound and Epicyclic gear trains – Differentials

WEEK 13 CYCLE TEST II**WEEK 6**

Thermit welding – Electron beam welding – Friction welding – Diffusion welding – Weld defects – Brazing and soldering process – Methods and process capabilities – Filler materials and fluxes – Types of Adhesive bonding

WEEK 7 CYCLE TEST I**WEEK 8****UNIT III - BULK DEFORMATION PROCESSES**

Hot working and cold working of metals – Forging processes – Open, impression and closed die forging – Characteristics of the process – Types of Forging Machines – Typical forging operations – Rolling of metals – Types of Rolling mills

WEEK 9

Flat strip rolling – Shape rolling operations – Defects in rolled parts - Principle of rod and wire drawing - Tube drawing — Principles of Extrusion – Types of Extrusion – Hot and Cold extrusion — Equipments used

WEEK 10**UNIT IV - SHEET METAL PROCESSES**

Sheet metal characteristics - Typical shearing operations, bending and drawing operations – Stretch forming operations — Formability of sheet metal

WEEK 11

Test methods – Working principle and application of special forming processes - Hydro forming

WEEK 12

Rubber pad forming – Metal spinning – Introduction to Explosive forming, Magnetic pulse forming, Peen forming, Super plastic forming

WEEK 13 CYCLE TEST II**WEEK 14****UNIT V - MANUFACTURING OF PLASTIC COMPONENTS**

Types of plastics - Characteristics of the forming and shaping processes – Moulding of Thermoplastics – Working principles and typical applications of - Injection moulding – Plunger and screw machines

WEEK 15

Compression moulding, Transfer moulding - Typical industrial applications – Introduction to Blow moulding – Rotational moulding – Film blowing

WEEK-16

Extrusion - Thermoforming, - Bonding of Thermoplastics

ME 2202 - ENGINEERING THERMODYNAMICS

WEEK 1

UNIT I - BASIC CONCEPT AND FIRST LAW

Basic concepts - concept of continuum, macroscopic approach, Thermodynamic systems - closed, open and isolated

WEEK 2

Property, state, path and process, quasi-static process, work, modes of work, Zeroth law of thermodynamics – concept of temperature and heat Concept of ideal and real gases, First law of thermodynamics

WEEK 3

Application to closed and open systems, internal energy, specific heat capacities, enthalpy, steady flow process with reference to various thermal equipments

WEEK 4

UNIT II - SECOND LAW

Second law of thermodynamics – Kelvin's and Clausius statements of second law

WEEK 5

Reversibility and irreversibility, Carnot theorem, Carnot cycle, reversed carnot cycle

WEEK 6

efficiency, COP. Thermodynamic temperature scale, Clausius inequality, concept of entropy, entropy of ideal gas, principle of increase of entropy – availability

WEEK 7 CYCLE TEST I

WEEK 8

UNIT III - PROPERTIES OF PURE SUBSTANCE AND STEAM POWER CYCLE

Properties of pure substances – Thermodynamic properties of pure substances in solid, liquid and vapour phases, phase rule, P-V, P-T, T-V, T-S, H-S diagrams, PVT surfaces

WEEK 9

Thermodynamic properties of steam Calculations of work done and heat transfer in non-flow and flow processes Standard Rankine cycle, Reheat and regenerative cycle

WEEK 10

UNIT IV IDEAL AND REAL GASES AND THERMODYNAMIC RELATIONS

Gas mixtures – properties ideal and real gases, equation state, Avagadro's Law

WEEK 11

Vander Waal's equation of state, compressability factor, compressability chart

WEEK 12

Dalton's law of partial pressure, exact differentials, T-D relations, Maxwell's relations, Clausius Clapeyron equations, Joule –Thomson coefficient

WEEK 13 CYCLE TEST II

WEEK14

UNIT V PSYCHROMETRY

Psychrometry and psychrometric charts, property calculations of air vapour mixtures. Psychrometric process

WEEK 15

Sensible heat exchange processes. Latent heat exchange processes. Adiabatic mixing

WEEK-16

Evaporative cooling

ME 2203 - KINEMATICS OF MACHINERY

WEEK 1

UNIT I BASICS OF MECHANISMS

Definitions – Link, Kinematic pair, Kinematic chain, Mechanism, and Machine. -Degree of Freedom