


IV Sem Lesson Plan

CMR Institute of Technology, Bangalore		
Department(s): IS , Mechanical		
Semester: 04	ALL BRANCHES	
Engineering Mathematics IV	10MAT41	Lectures/week: 06
Course Instructor(s): Uma Raju		
Course duration: 18 Jan 2015 – 21 May 2015		

Course outline

Class	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
01 -10	NUMERICAL METHODS-I TB1-31.1-31.8	Numerical Solution of ordinary differential equations of first order	12.5	12.5
		Numerical methods for initial value problems		
		Picard's method		
		Taylor's series method		
		Modified Euler's method		
		Runge-Kutta method of fourth order		
		Predictor and corrector methods Milne's Method		
		Predictor and corrector methods Adams-Bashforth)		
11-20	NUMERICAL METHODS-2 TB1-31.9-31.10	Numerical solution of simultaneous first order ODEs	12.5	25
		Picard's Method		
		Problems on Picard's Method and Runge-Kutta method of fourth order		
		Runge-Kutta method of fourth order		
		Numerical solution of second order ODES -Picard's Method		

		Problems on Picards method		
		Numerical solution of second order ODES Runge-Kutta method		
		Problems on Runge-Kutta method. concept on Milne's method		
		Tutorial class		
21-30	PROBABILITY -I TB1-26.1-26.6	Introduction to Probability, Definitions	12.5	37.5
		Probability theorems, addition theorem of probability and problems		
		Probability associated with set theory		
		Random experiments, Sample Space and events		
		Axioms of probability		
		Conditional Probability, problems		
		Multiplication Law, problems		
		Baye's Theorem-proof		
		Problems on Baye's Theorem		
31-40	PROBABILITY -II TB1-26.7-26.18	Random Variables(Discrete random and continuous variables)	12.5	50
		Bernoulli's theorem,-Binomial Distribution(Mean and Standard deviation of the Binomial Distribution)		
		Problems on Binomial Distribution		
		Poisson distribution(Mean and Standard deviation of the Poisson Distribution)		
		Continuous Probability distributions		
		Exponential distribution(Mean and Standard deviation of the Exponential Distribution and problems)		
		Normal distribution and Standard Normal distribution		
		Problems on Normal distribution and Standard Normal		

		distribution		
41-50	COMPLEX VARIABLES-I- TB1-20.1-20.6	Function of a complex variable, limit, continuity, differentiability	12.5	62.5
		Cauchy-Riemann equations in Cartesian and Polar form		
		Harmonic function, orthogonal property		
		Finding the derivative of an analytic function Milne-Thompson method		
		Finding the conjugate harmonic function and the analytic function		
		Properties of analytic functions		
		Harmonic Property		
		Orthogonal Property		
		Application to flow problems		
51-58	COMPLEX VARIABLES-II TB1-20.7-20.14	Conformal transformation	12.5	75
		Bilinear transformation		
		Discussion of $w = z^2$		
		Discussion of $w = e^z$		
		Discussion of $w = z + a^2/z$		
		Complex line integral		
		Cauchy's theorem and integral formula		
59-66	SPECIAL FUNCTIONS TB1-16.1-16.17	Solution of Laplace Equation in cylindrical system leading to Bessel differential equation	12.5	87.5
		Solution of Laplace Equation in Spherical system leading to Bessel differential equation		
		Properties on Bessel functions		
		Legendre's equation		
		Bessel's function and properties		
		Orthogonal Property of Bessel's function		

		Series Solution of Legendre's Differential equation		
		Rodrigue's formula-Derivation and problems		
		Problems on Rodrigue's formula		
67-75	SAMPLING THEORY TB1-27.1-27.18	Sampling distribution	12.5	100
		Testing Hypothesis		
		Standard error		
		Test for hypothesis for means		
		Limits for means		
		Student's <i>t</i> distribution		
		Test of Significance of Difference between sample means		
		Chi square distribution		

Syllabus for Internal Assessment Tests (IAT)*


Sessional	Syllabus
T1	01-40
T2	41-66
T3	67-75

* See calendar of events for the schedules of IATs.

Literature:

Book Type	Code	Author & Title	Publication information	
			Edition & Publisher	ISBN
Text Book	TB1	B.S.Grewal, Higher Engineering Mathematics, Latest Edition, Khanna publishers	Latest edition, khanna publications	8174091955
Text Book	TB2	Erwin Kreyszig, Advanced Engineering Mathematics, Latest Edition, Wiley Publication	Wiley India publishers	978812653135
References	RB1	B.V.Ramana, Higher Engineering Mathematics,.	Latest Edition, Tata Mc.Graw Hill Publications	---

References	RB2	Peter V .O'Neil, Engineering Mathematics	Cengage Learning India Pvt. Ltd.Publishers	---
References	RB3	Dr.D.S.C, Engineering Mathematics IV	5 th Edition 2011	978-81-7686-675-4
References	RB4	Dr.K.S.C, Engineering Mathematics IV	2011-2012	---

CMR Institute of Technology, Bangalore				
Department(s): Mechanical Engineering				
Semester: 04	Section(s): 4 A & B			
Mechanical Measurement and Metrology		10ME42B	Lectures/week: 05	
Course Instructor(s): Puneeth Kumar N				
Course duration: 18 Jan 2015 – 21 May 2015				
Class #	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1-6	Unit-I Standards of measurement. TB1: 1.1 to 1.12, TB2: 3.1 to 3.7 RB1 & RB2	Definition and Objectives of metrology, Standards of length - International prototype meter, Imperial standard yard Wave length standard, subdivision of standards Line and end standard, comparison, transfer from line standard to end standard calibration of end bars (Numerical), Slip gauges, Wringing phenomena Indian Standards (M- 81, M-112), Numerical problems on building of slip gauges.	12.5 %	12.5 %

7-13	<p style="text-align: center;">Unit-II System of Limits, Fits, Tolerance and Gauging TB1:2.1 to 2.29, TB2:4.1 to 4.5 & 4.11 to 4.13, RB1 & RB2</p>	<p>Definition of tolerance, Specification in assembly</p> <p>Principle of inter changeability and selective assembly limits of size, Indian standards</p> <p>Concept of limits of size and tolerances, compound tolerances, accumulation of tolerances</p> <p>Definition of fits, types of fits and their designation (IS 919 -1963), geometrical tolerance</p> <p>Positional - tolerances, hole basis system, shaft basis of system</p> <p>Classification of gauges, brief concept of design of gauges (Taylor's principles), Wear allowance on gauges</p> <p>Types of gauges -plain plug gauge, ring Gauge, snap gauge, limit gauge and gauge materials.</p>	12.5 %	25 %
14-20	<p style="text-align: center;">Unit-V Measurements and measurement systems TB1: 5.1 to 5.25, RB1 & RB2</p>	<p>Definition, Significance of measurement</p> <p>Generalized measurement system, definitions and concept of accuracy, precision,</p> <p>Calibration, threshold, sensitivity, hysteresis, repeatability</p> <p>Linearity, loading effect, system response-times delay</p> <p>Errors in Measurements, Classification of Errors.</p> <p>Transducers, Transfer efficiency, Primary and Secondary transducers, electrical,</p> <p>Mechanical, electronic transducers, advantages of each type transducers</p>	12.5 %	37.5%

21-26	<p align="center">Unit-VI Intermediate modifying and terminating devices TB1:6.1 to 6.16, TB2, RB1 & RB2</p>	<p>Mechanical systems, inherent problems</p> <p>Electrical intermediate modifying devices</p> <p>Input circuitry, ballast, ballast circuit,</p> <p>Electronic amplifiers and telemetry</p> <p>Terminating devices, Mechanical, Cathode Ray Oscilloscope</p> <p>Oscillographs, X-Y Plotters</p>	12.5 %	50 %
27-33	<p align="center">Unit-III Comparators and Angular measurement TB1:3.1 to 3.17, TB2:5.1 to 5.8 RB1 & RB2</p>	<p>Introduction to Comparator, Characteristics</p> <p>Classification of comparators, mechanical comparators -Johnson Mikrokator, Sigma Comparators</p> <p>Sigma Comparators, dial indicator, Optical Comparators -principles</p> <p>Zeiss ultra optimeter, Electric and Electronic Comparators -principles,</p> <p>LVDT, Pneumatic Comparators, back pressure gauges, Solex Comparators</p> <p>Angular measurements, Bevel Protractor, Sine Principle and. use of Sine bars, Sine center</p> <p>Use of angle gauges, (numericals on building of angles) Clinometers.</p>	12.5 %	62.5 %
34-39	<p align="center">Unit-IV Interferometer and screw thread, gear measurement. TB1:4.1 to 4.24, TB2:13.1 to 13.4 RB1 & RB2</p>	<p>Interferometer Principle of interferometry, autocollimator</p> <p>Optical flats. Terminology of screw threads</p> <p>Measurement of major diameter, minor diameter pitch, angle</p> <p>Effective diameter of screw threads by 2-wire and 3-wire methods Best size wire</p> <p>Toolmakers microscope, gear terminology</p> <p>Use of gear tooth Vernier caliper and gear tooth micrometer</p>	12.5%	75%

40-45	<p align="center">Unit-VII Measurement of force, torque and pressure TB1:7.1 to 7.16, TB2:6.1 to 6.10 RB1 & RB2</p>	<p>Principle, analytical balance</p> <p>Platform balance, proving ring</p> <p>Torque measurement, Prony brake,</p> <p>Hydraulic dynamometer. Pressure Measurements</p> <p>Principle, use of elastic members, Bridgeman gauge</p> <p>McLeod gauge, Pirani Gauge.</p>	12.5 %	87.5%
46-52	<p align="center">Unit-VIII Temperature and strain measurement TB1:8.1 to 8.31, TB2, RB1 & RB2</p>	<p>Resistance thermometers, thermocouple,</p> <p>Law of thermocouple materials used for construction</p> <p>Pyrometer, Optical Pyrometer</p> <p>Strain Measurements, Strain gauge,</p> <p>Preparation and mounting of strain gauges</p> <p>Gauge factor, methods of strain measurement</p>	12.5 %	100%


Syllabus for Sessionals:

Sessional #	Syllabus
T1	Class # 01-18
T2	Class # 19-38
T3	Class # 39-52

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book	TB1	Mechanical Measurements and Metrology, Dr. T. Chandrashekar	Edition 2013, Subhas	978-93-83214-19-8
Text Book	TB2	Engineering Metrology, R.K. Jain	Khanna Publishers	81-7409-153-X

References	RB1	Metrology & Measurement, Anand K. Bewoor & Vinay A.Kulkarni,	Tata McGraw Hill Pvt. Ltd., New-Delhi	978-0-07-014000-4
References	RB2	Engineering Metrology, I.C. Gupta	Dhanpat Rai Publications, Delhi.	-

CMR Institute of Technology, Bangalore		
Department(s): Basic Sciences & Humanities		
Semester: 06	Section(s):	
Applied Thermodynamics	10ME43	Lectures/week: 06
Course Instructor(s): Narendra N		
Course duration: 18 Jan 2015 – 21 May 2014		

Class #	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1-6	TB1: 3.1 to 3.14	I.C. Engine: Morse test, swinging field dynamometer, Motoring Method, Willian's line method, Heat balance Sheet, Numerical problems	13.5%	13.5 %
7-16	TB1: 4.1 to 4.15	Vapour Power Cycles: Carnot vapour power cycles, drawbacks as a reference cycle, Simple Rankine cycle, description, T- S diagram, analysis for performance, comparison of Carnot and Rankine cycles Effects of pressure and temperature on Rankine cycle performance, Actual vapour power cycles. Ideal and practical regenerative Rankine cycle, open and closed feed water heaters, Reheat Rankine cycle, Numerical problems	13.5 %	27 %
17-22	TB1: 2.1 to 2.14	Gas power cycle : Air Standard cycles, Carnot, Otto, Diesel cycles P-V and T-S diagrams, description, Dual and Stirling cycles P-V and T-S diagrams, description .Efficiencies and mean Effective pressures, Comparison of Otto, Diesel and dual cycles. Numerical problems.	11.5%	38.5%
23-30	TB2: 7.1 to 7.9	Refrigeration: Vapour compression refrigeration system Refrigerating effect, capacity, Power required units of Refrigeration. Refrigerants and their desirable properties reversed Carnot cycle reversed Brayton cycle. Vapour absorption Refrigeration system, Steam jet Refrigeration Numerical problems	11.5%	50%

31-41	TB2: 8.1 to 8.8	Psychrometry: Atmospheric air and psychrometric properties; Dry bulb temperature, wet bulb temperature, dew point temperature Partial pressures, specific and relative humidity and the relation between the two enthalpy and adiabatic saturation temperature. Construction and use of psychrometric chart. Analysis of various processes; heating, cooling, dehumidifying and humidifying. Adiabatic mixing of moist air Summer and winter air conditioning Numerical problems	11.5%	61.5%
42-43	TB2: 6.1 to 6.8	Reciprocating Compressors: of a single stage reciprocating compressors, work input through P-V diagram and steady state steady flow analysis. Effect of clearance and volumetric efficiency. Adiabatic, isothermal and mechanical efficiencies. Multistage compressor, saving in work, optimum intermediate pressure, inter- cooling, minimum work for compression.	15.4%	77%
50-57	TB1: 3.1 to 3.9	Combustion thermodynamics: Theoretical (Stoichiometric) air and excess air for combustion of fuels Mass balance, actual combustion. Exhaust gas analysis. A./ F ratio, Energy balance for a chemical reaction enthalpy of formation, enthalpy and internal energy of combustion, Combustion efficiency, adiabatic flow temperature Numerical problems	11.5%	88.5%
58-62	TB1: 5.1 to 5.9	Gas turbine and Jet propulsion: Classification of Gas turbines Analysis of open cycle gas turbine cycle, Advantages and disadvantages of closed cycle. Methods to improve thermal efficiency Numerical problems	11.5%	100%


Syllabus for Sessionals :

Sessional #	Syllabus
T1	Class # 01 – 17
T2	Class # 15 – 35
T3	Class # 27 – 50

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book		Basic and applied Thermodynamics	P.K. Nag, 2nd Ed.,Tata McGraw Hill Pub.Co,2002	
Text Book		Applied Thermodynamics	Rajput, Laxmi Publication	

Text Book		Applied Thermodynamics	B.K. Venkanna, Swati B. Wadavadagi, PHI, New Delhi, 2010	
References		Thermodynamics , An engineering approach	Yunus, A. Cengel and Michael A.Boies, 6th Ed., Tata McGraw Hill pub. Co., 2002	
References		Fundamental of Classical Thermodynamics,	G.J. Van Wylen and R.E. Sontang Wiley eastern.	

CMR Institute of Technology, Bangalore		
Department: Mechanical Engineering		
Semester: 04	Section(s): A & B	
Kinematics of Machines	10ME44	Lectures/week: 06
Course Instructor(s): Mrs. Smruti Rekha Swain		
Course duration: 18 Jan 2016 –21 May 2016		

Lesson Plan

# Class	Chapter Title/ Reference Literature	Topic Covered	Percentage of portion covered	
			Reference	Cumulative
1-7	UNIT – 1 TB1:1.1 to 1.13, 1.16 to 1.17 TB2 : 1.1 to 1.12	Introduction to KOM, Basic Definitions, Grubler's Criterion, Kinematic Chain, Mechanism Chain Structure, Mobility of Mechanism, Inversion, Machine, Inversion of Four Bar Chain, Inversion of Single Slider Crank Chain, Inversion of Double Slider, Crank Chain, Numericals.	12.5%	12.5%
8-13	UNIT – 2 TB1:1.11,1.16, 6.1 to 6.2, 6.5 TB2: 3.2 to 3.4, 3.7.2	Quick Return-Drag Link Mechanism, Withworth Mechanism, Crank and Slotted lever mechanism, Peaucellier's Mechanism, Robert's Mechanism, Geneva Wheel Mechanism, Ratchet and Pawl, Mechanism, Toggle Mechanism, Pantograph, Ackerman Steering Gear Mechanism, Numericals.	12.5%	25%
14-19	UNIT – 8 TB1: 7.1 to 7.10 TB2: 7.1 to 7.14	Introduction, Types of Cams and Followers, Definitions, Displacement, Velocity and acceleration time curves for Cam Profiles, Disc Cam with Reciprocating Follower having knife edge, Roller and Flat face Follower, Disc Cam with oscillating roller follower, Follower motions including SHM, Uniform Velocity, Acceleration and Retardation and Cycloidal Motion, Numericals.	12.5%	37.5%
20-26	UNIT – 6 TB1: 10.1 to 10.26 TB2: 11.1 to 11.22	Gear Terminology and its Classification, Law of Gearing, Velocity of Sliding, Forms of Teeth, Cycloidal Profile Teeth, Involute Profile Teeth, Characteristics of Involute action, Path of Contact, Arc of Contact, Contact Ratio, Interference of Involute gears, Methods of avoiding Interference, Backlash, Comparison of Involute and Cycloidal teeth, Profile Modifications, Numericals.	12.5%	50%
27-33	UNIT – 7 TB1: 11.1 to 11.2, 11.4 to 11.9 TB2: 12.1 to 12.7	Simple Gear Trains, Compound Gear Trains, Epicyclic Gear Trains, Velocity Ratio of Epicyclic Gear Trains by Algebraic and Tabular Methods, Tooth load and Torque calculations in Epicyclic Gear Trains, Numericals.	12.5%	62.5%

34-40	UNIT – 3 TB1: 2.1 to 2.10, 3.1 to 3.6 TB2: 2.1 to 2.3, 2.5 to 2.6	Velocity Analysis of a Four Bar Mechanism, Velocity Analysis of a Slider Crank Mechanism, Velocity Analysis of Simple Mechanisms, Acceleration Analysis of a Four Bar Mechanism, Acceleration Analysis of a Slider Crank Mechanism, Acceleration Analysis of Simple Mechanisms, Coriolis Component of Acceleration, Angular Velocity and acceleration, Velocity of Rubbing.	12.5%	75%
41-46	UNIT – 4 TB1: 2.12 to 2.16, 3.8 TB2: 2.4, 2.8	Velocity Analysis by Instantaneous Method: Definitions, Kennedy’s Theorem, Determination of linear velocity using Instantaneous Centre Method, Determination of angular velocity using Instantaneous Centre Method, Klien’s Construction: Velocity Analysis of Single Slider Crank Mechanism, Klien’s Construction: Acceleration Analysis of Single Slider Crank Mechanism, Numericals.	12.5%	87.5%
47-52	UNIT – 5 TB1: 2.11, 3.7 TB2: 2.9	Complex Algebra for Velocity Analysis for Four Bar Mechanism and Slider Crank Mechanism, Complex Algebra for Acceleration, Analysis for Four Bar Mechanism and Slider Crank Mechanism, Numericals, Vector Algebra for Velocity Analysis for Four Bar Mechanism and Slider Crank Mechanism, Vector Algebra for Acceleration Analysis for Four Bar Mechanism and Slider Crank Mechanism, Numericals.	12.5%	100%

Syllabus for Internal Assessment Tests (IAT)*


Sessional #	Classes	Syllabus
T1	1 – 18	33%
T2	19 – 32	30%
T3	33 – 52	37%

* See calendar of events for the schedules of IATs.

LITERATURE:

Book Type	Code	Author and Title	Publication Information	
			Edition & Publisher	ISBN #
Text Book	TB1	“Theory of Machines”, Rattan S.S	3 rd Edition 2009, Tata McGraw Hill Publishing Company, New Delhi	978-0-07-014477-4
Text Book	TB2	“Theory of Machines”, Sadhu Singh	2 nd Edition 2006, Pearson Education(singapore)	978-81-7758-127-0
Reference book	RB1	“Theory of Machines”, Thomas Bevan	3 rd Edition 2011, Pearson Education Ltd, UK.	978-81-317-2965-6
Reference book	RB2	“Theory of Machines & Mechanisms”, John J Uicker JR. Gordon R. Pennock, Joseph E. Shingley	3 rd Edition 2009, Oxford University Press, UK.	0-19-806232-X

Note: From time to time, assignments will be posted on https://sites.google.com/a/cmrit.ac.in/smruti_rekha/home

CMR Institute of Technology, Bangalore		
Department(s): Mechanical Engineering		
Semester: 04	Section(s): A & B	
Manufacturing Process II	10ME45	Lectures/week: 05
Course Instructor(s): Mr. SAGAR M BALIGIDAD		
Course duration: 18 Jan. 2016 – 21 May 2016		

Lesson Plan

Lecture #	Book & Sections	Topics	Portions coverage %	
			Individual	Cumulative
1-7	TB1: 1.1 to 1.11	Theory of Metal Cutting: Single point cutting tool nomenclature, geometry. Mechanics of Chip Formation, Types of Chips. Merchant's circle diagram and analysis, Ernst Merchant's solution, shear angle relationship, problems of Merchant's analysis. Tool Wear and Tool failure, tool life. Effects of cutting parameters on tool life. Tool Failure Criteria, Taylor's Tool Life equation. Problems on tool life evaluation.	12.5%	12.5 %
8-14	TB1: 2.1 to 2.3	Cutting Tool Materials: Desired properties and types of cutting tool, materials – HSS, carbides coated carbides, ceramics. Cutting fluids. Desired, properties, types and selection. Heat generation in metal cutting, factors affecting heat generation. Heat distribution in tool and work piece and chip. Measurement of tool tip temperature.	12.5 %	25 %
15-21	TB1: 3.1 to 3.2	Turning (Lathe), Shaping and Planing Machines: Classification, constructional features of Turret and Capstan Lathe. Tool Layout, shaping Machine, Planing Machine, Driving mechanisms of lathe, shaping and planing machines, Different operations on lathe, shaping machine and planing machine. Simple problems on machining time calculations.	12.5%	37.5%
22-27	TB2: 5.1 to 4.32	Drilling machines: Classification, constructional features, drilling & related operations. Types of drill & drill bit nomenclature, drill materials. Introduction to CNC machines- Principles of operation. Axes of NC machine-Coordinate systems. Basics of Manual part programming methods.	12.5%	50%
28-33	TB2: 11.1 to 11.22	Milling machines: Classification, constructional features, milling cutters, nomenclature, milling operations, up milling and down milling concepts. Various milling operations. Indexing: Simple, compound, differential and angular indexing calculations. Simple problems on simple and compound indexing.	12.5%	62.5%

34-40	TB2-6.1 to 6.16	Grinding machines: Types of abrasives, Grain size, bonding process, grade and structure of grinding wheels, grinding wheel types. Classification, constructional features of grinding machines (Centerless, cylindrical and surface grinding). Selection of grinding wheel. Grinding process parameters. Dressing and truing of grinding wheels.	12.5%	75%
41-46	TB1: 3.6 to 3.8	Broaching process - Principle of broaching. Details of a broach. Types of broaching machines-constructional details. Applications. Advantages and Limitations. Finishing and other Processes Lapping and Honing operations –Principles, arrangement of set up and application. Super finishing process, polishing, buffing operation and application.	12.5%	87.5%
47-52	TB2: 20.1 to 20.12	Non-traditional machining processes: Need for nontraditional machining, Principle, equipment & operation of Laser Beam, Plasma Arc Machining, Electro Chemical Machining, Ultrasonic Machining, Abrasive Jet Machining, Water Jet Machining, Electron Beam Machining, Electron Discharge Machining and Plasma Arc Machining.	12.5%	100%

Syllabus for Internal Assessment Tests (IAT)*

IAT #	Syllabus
IAT-1	Class # 01 – 18
IAT-2	Class # 19 – 33
IAT-3	Class # 34 – 52


* See calendar of events for the schedules of IATs.

Literature:

Book Type	Code	Author & Title	Publication information	
			Edition // Publisher	ISB
Text Book	TB1	Dr. P C Sharma/ Manufacturing Technology II	3rd edition S Chand & Company LTD	81-219-2846-X
Text Book	TB2	Hazara Choudary / Production Technology	Vol II Media promoters &	81.85099-15-4
Text Book	TB3	HMT / Production Technology	Tata McGraw	0-07-096-443-2

Note: From time to time, assignments and other related information will be posted on

<https://sites.google.com/a/cmrit.ac.in/mp2/home>

CMR Institute of Technology, Bangalore		
Department: Mechanical Engineering		
Semester: 04	Section(s): A & B	
Subject: Fluid Mechanics	10ME46B	Lectures/week: 06
Course Instructor(s): Mr. Joseph Sajan		
Course duration: Jan 2016 – May 2016		

LESSON PLAN

Class No.	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1-6	Unit – 1 TB1/TB2/TB3	Properties of Fluids: Introduction, Types of fluid, Properties of fluids, viscosity, thermodynamic properties, surface tension, capillarity, vapour pressure and cavitation	12.5%	12.5%
7-14	Unit – 4 TB1/TB2/TB3	Fluid Dynamics: Introduction equation of motion, Euler's equation of motion, Bernoulli's equation from first principles and also from Euler's equation, limitations of Bernoulli's equation.	12.5%	25%
15-24	Unit – 5 TB1/TB2/TB3	Fluid Flow Measurements: Venturimeter, orificemeter, pitot-tube, vertical orifice, V-Notch and rectangular notches. Dimensional Analysis: Introduction, derived quantities, dimensions of physical quantities, dimensional homogeneity, Rayleigh's method, Buckingham p theorem, dimensionless numbers, similitude, types of similitude.	12.5%	37.5%
25-32	Unit – 6 TB1/TB2/TB3	Flow through pipes: Minor losses through pipes. Darcy's and Chezy's equation for loss of head due to friction in pipes. HGL and TEL.	12.5%	50%

33-41	Unit – 2 TB1/TB2/TB3	Fluid Statistics: Fluid pressure at a point, Pascal’s law, pressure variation in a static fluid, absolute, gauge, atmospheric and vacuum pressures, simple manometers and differential manometers. Total pressure and center of pressure on submerged plane surfaces; horizontal, vertical and inclined plane surfaces, curved surface submerged in liquid.	12.5%	62.5%
42-47	Unit – 7 TB1/TB2/TB3	Laminar flow and viscous effects : Reynold’s number, critical Reynold’s number, laminar flow through circular pipe-Hagen Poiseille’s equation, laminar flow between parallel and stationary plates.	12.5%	75%
48-54	Unit – 8 TB1/TB2/TB3	Flow past immersed bodies: Drag, Lift, expression for lift and drag, boundary layer concept, displacement, momentum and energy thickness. Introduction to compressible flow: Velocity of sound in a fluid, Mach number, Mach cone, propagation of pressure waves in a compressible fluid.	12.5%	87.5%
55-60	Unit – 3 TB2/TB3/RB1	Buoyancy and Fluid Kinematics: Buoyancy, center of buoyancy, metacentre and metacentric height, conditions of equilibrium of floating and submerged bodies, determination of Metacentric height experimentally and theoretically. Kinematics: Types of fluid flow, continuity equation in 2D and 3D (Cartesian Co-ordinates only), velocity and acceleration, velocity potential function and stream function.	12.5%	100%

Syllabus for Sectionals:

Sessional No.	Syllabus
T1	Class No. 01 – 14
T2	Class No. 15 – 41

Literature:

Book Type	Code	Author & Title	Edition & Publisher
Text Book	TB1	Fluid Mechanics , Dr. Bansal,	R.K.Lakshmi Publications, 2004
Text Book	TB2	Fluid Mechanics (SI Units) , Yunus A. Cengel John M. Cimbala	2 nd Ed., Tata McGraw Hill, 2006
Text Book	TB3	Fluid Mechanics and Fluid Power Engineering , Kumar D.S	Kataria and Sons, 2004
Reference Book	RB1	Fluid Mechanics , John F Douglas, Janul and M. Gasiosek	5 th edition 2006, Pearson Education Asia