MERI College of Engineering & Technology
(MERI-CET)

Session: 2018-2019 **Course: B.Tech**
Department: Civil Engineering **Semester: 3rd**
Subject: FM-1, CE-205-F **Faculty name: AKANSHA**

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FOCAL POINTS

1. The main objective in the very beginning classes of this subject is to provide basis knowledge regarding this subject.
2. After that we will move to our university syllabus. We will start from section one.
3. Laboratory Experiments will be conducted regularly (one lab per week).
4. Group discussion will be organized to remove hesitation of students.
5. Website links will be provided to student for getting recently developed fundamentals related to subject.
6. Regular class tests will be conducted to check the performance of students.
7. We will finish the entire syllabus within designed time duration, so that we may get time for revision work.
8. All the sections of syllabus will be given equal and maximum
9. Class room as well as power point presentations will be taken from students regularly.
10. Student Doubts will be cleared by managing some extra classes.
11. Stress will be given on practical and field knowledge , which will be the master success key for student.

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TEACHING METHODOLOGY

COURSE OBJECTIVE

A complete study about all the properties of fluid and every law involved in it ,is called fluid mechanics. The main objective of this subject is to provide knowledge about flow of fluids . that is liquids and gases.

METHODOLOGY

The Procedure will be lectures, presentations, Tutorials, Tests, assignments of class work and Practicle Labs..

ACHIEVEMENT

At the end of semester, students will have a basic knowledge of Fluid , its basic properties.

EVALUATION

Besides the semester end – examination, the students will be continuously assessed during the course on the following basis

i. Mid Term Examinations 30 Marks

ii. Internal Assessment 20 Marks (Assignments +Attendance)

Iii End Semester Examination 100 Marks

Total : 150 Marks

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SYLLABUS AS PER MDU

SECTION-A

Unit-I: Introduction: Fluid properties, mass density, specific weight, specific volume and Specific volume and specific gravity, surface tension, capillarity, pressure inside a droplet and bubble due to surface tension, compressibility, viscosity, Newtonian and Non-Newtonian fluids, real and ideal fluids.

Unit-II: Kinematics of Fluid Flow: Steady & unsteady, uniform and non-uniform, laminar & turbulent flows, one, two & three dimensional flows, stream lines, streak lines and path lines, continuity equation in differential form, rotation and circulation, elementary explanation of stream function and velocity potential, rotational and irrotational flows, free and forced vortex flow, graphical and experimental methods of drawing flow nets.

SECTION-B

Unit-III: Fluid Statics: Pressure-density-height relationship, gauge and absolute pressure, simple differential and sensitive manometers, two liquid manometers, pressure on plane and curved surfaces, centre of pressure, Buoyancy, stability of immersed and floating bodies, determination of metacentric height, fluid masses subjected to uniform acceleration

SECTION-C

Unit-IV: Dynamic of Fluid Flow: Euler`s equation of motion along a streamline and its integration, limitation of Bernoulli's equation, Pitot tubesturim , veneter, Orficemeter, flow through orifices & mouth pieces, sharp crested weirs and notches, aeration of nappe.

Unit-V: Boundary layer analysis: Boundary layer thicknesses, boundary layer over a flat plate, laminar boundary layer, and turbulent boundary layer, laminar sub -layer, smooth and rough boundaries, local and average friction coefficient, separation and its control.

SECTION-D

Unit-VI: Dimensional Analysis and Hydraulic Similitude: Dimensional analysis, Buckingham theorem, important dimensionless numbers and their significance, geometric, kinematic and dynamic similarity, model studies, physical modeling, similar and distorted models.

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Name of the Faculty : Ms AKANSHA

Discipline : Civil Engineering

Semester : 3rd

Subject : FM-1, CE-205-F

Lesson Plan Duration : 15 Weeks (From August 2018 to November 30)

Work load (Lectures/Practical)

Per week (in hours) : Lectures-04, Practicals-02

WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC (including assignment /test)	PRACTICAL DAY	TOPIC
1ST	1st	Introduction of Fluid properties	1st	Verification of Bernoullis Theorem
	2nd	Mass density, specific weight, specific volume and Specific volume, Specific gravity, surface tension,capillarity		
	3rd	Pressure inside a droplet and bubble due to surface tension, compressibility, viscosity		
	4th	Newtonian and Non-Newtonian fluids		
2ND	5th	Kinematics of Fluid Flow - Steady & unsteady, uniform and non-uniform	2nd	
	6th	Laminar & turbulent flows, one, two & three dimensional flows		
	7th	Stream lines, streak lines and path lines		
	8th	Continuity equation in differential form, rotation and circulation,		
3rd	9th	Elementary explanation of stream function and velocity potential, rotational and irrotational flows	3rd	Calibration of V notch
	10th	Free and forced vortex flow		
	11th	Graphical and experimental methods of drawing flow nets		

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	12th	**REVISION & TEST FOR SECTION- A**		
4th	**13th**	**UNIT-III** Fluid Statics- Pressure-density-height relationship, gauge and absolute pressure	**4th**	Calibration of Rectangular Notch
	14th	Simple differential and sensitive manometers, two liquid manometers		
	15th	Pressure on plane and curved surfaces, centre of pressure		
	16th	Buoyancy, stability of immersed and floating bodies		
5th	**17th**	Determination of metacentric height, fluid masses subjected to uniform acceleration	**5th**	Calibration of Trapezoidal notch
	18th	**REVISION & TEST FOR SECTION-B**		
	19th	Dynamic of Fluid Flow- Euler`s equation of motion along a streamline		
	20th	Euler`s equation of motion along a streamline		
6th	**21st**	Euler`s equation of motion along a streamline and its integration	**6th**	Determination of Metacentric height
	22nd	Bernoulli's equation,		
	23rd	Limitation of Bernoulli's equation,		
	24th	Bernoulli's equation's principle,law and assumptions		
7th	**25th**	Pitot tubesturim diagram and theory	**7th**	**SESSIONAL-I EXAMINATION**
	26th	Veneter, its definition, uses and working		
	27th	Orficemeter, its use and working		
	28th			
8th	**29th**	Flow through orifices	**8th**	Determination of coefficient Cd, Cv and Cc
	30th	Flow through mouth pieces		
	31st	Difference between notches and weirs		
	32nd	Sharp crested weirs and notches definiton		
9th	**33rd**	Sharp crested weirs and notches their equations and diagrams	**9th**	Calibration of Venturimeter
	34th	Aeration of nappe , its need and definition		
	35th	Boundary layer analysis introduction		
	36th	Boundary layer thicknesses definition and theory		

MERI COLLEGE

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10th	**37th**	Boundary layer over a flat plate	**10th**	Calibration of Orifice Plate
	38th	Laminar boundary layer		
	39th	Turbulent boundary layer,		
	40th	Laminar sub -layer		
11th	**41st**	Smooth and rough boundaries	**11th**	Determination of surface tension of liquids
	42nd	Local and average friction coefficient		
	43rd	Boundary separation and its control		
	44th	**REVISION & TEST FOR SECTION-C**		
12th	**45th**	Dimensional Analysis and Hydraulic Similitude: Dimensional analysis	**12th**	
	46th	Buckingham theorem		
	47th	Important dimensionless numbers and their significance		
	48th	Geometric, kinematic and dynamic similarity		
13th	**49th**	Model studies	**13th**	**SESSIONAL-II EXAMINATION**
	50th	Physical modeling		
	51st	Similar and distorted models		
	52nd	**REVISION OF UNIT-I,II**		
14th	**53rd**	**REVISION OF UNIT-II,III**	**14th**	Study the properties of vortex flow
	54th	**REVISION OF UNIT-III,IV**		
	55th	**REVISION OF UNIT-IV,V**		
	56th	**REVISION OF UNIT-V,VI**		
15th		**PRE-UNIVERSITY EXAMINATION**	**15th**	**PRE-UNIVERSITY EXAMINATIONS**

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Text books & References:

Hydraulic and Fluid Mechanic by P.N.Modi & S.M.Seth

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ASSIGNMENTS

Assignment – I

1 Define a Fluid.

2 Fluid Mechanics.

3 Specific Gravity.

4 Specific Volume.

5 Cappilarity

6 Pressure Inside a hollow bubble.

7 Viscosity

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Assignment – II

1. What is the difference between an ideal fluid and a real fluid.
2. What do you mean by absolute pressure, gauge pressure and atmospheric pressure?
3. What is a venturiemter? Derive an expression for discharge through a venturimeter?
4. Explain various head losses in the flow through a pipeline.
    i. Steady and unsteady flow
    ii. Uniform and non-uniform flow in the case of open channels?
5. Explain giving neat line diagram, the construction and working of a reciprocating pump. Why it is called a positive displacement pump?
6. Why a mouthpiece is preferred to an orifice? Obtain an expression for time of emptying a tank through an orifice provided at its bottom.

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Assignment – III

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1. Pressure-density-height relationship.
2. Two liquid manometers.
3. Fluid masses subjected to uniform acceleration
4. Buoyancy, stability of immersed and floating bodies
5. Graphical and experimental methods of drawing flow nets
6. Pressure on plane and curved surfaces

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Assignment – IV

1. Euler`s equation of motion along a streamline and its Integration
2. Limitation of Bernoulli's equation
3. Boundary layer over a flat plate
4. Dimensional analysis, Buckingham theorem
5. Dimensional Analysis and Hydraulic Similitude: physical modeling, similar and distorted models.
6. DEFINE: venturimeter, Orficemeter, flow through orifices & mouth pieces.

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Assignment – V

1. Newtonian and Non Newtonian fluids, real and ideal fluids.
2. DEFINE: mass density, specific weight.
3. DEFINE: Steady & unsteady, uniform and non-uniform, laminar & turbulent flows
4. Explain elementary explanation of stream function and velocity potential.
5. Define rotational and irrotational flows, free and forced vortex flow

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