Department of Mechanical Engineering

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE TEMPLATE			
Course Title	FLUID MECHNAICS		
Course Code	MEPC18	No. of Credits	3
Department	MECHANICAL ENGINEERING	Faculty	Dr. SURESH S
Pre-requisites Course Code	Engineering Mechanics	Year/Section	II year, Section A
Course Coordinator(s) (if, applicable)	Dr. T. Suthakar Dr. S. Suresh		
Other Course Teacher(s)/Tutor(s), E-mail	suthakar@nitt.edu suresh@nitt.edu	Telephone No.	9842483638
Course Type	■ Core course	☐ Elective course	

COURSE OVERVIEW

The course provides a stuctured approach on the understanding of fluid properties and application of such properties into different practical scenarios and industrial aspects. The design of the course includes the introduction to the fluid properties, understanding on different kinds of flow patterns, framing the governing equations for steady, incompressible flow, inviscid flow and so on. The course further extends the insight into Eulerian approach and Lagrangian approach and hence analysis based on boundary layer and dimensions.

COURSE OBJECTIVE

1. To familiarize with the properties of fluids and the applications of fluid mechanics.
2. To formulate and analyze problems related to calculation of forces in fluid structure interaction.
3. To classify flows and to understand and apply the conservation a principle for fluid flows.
4. To understand the principles of dimensional analysis.

COURSE OUTCOMES (CO)

Upon the completion of the course, the students will be able	Aligned Programme Outcomes (PO)
1. Identify the values of fluid properties and relationship between them and understand the principles of continuity, momentum, and energy as applied to fluid motions	1,2,3,7,10
2. Recognize these principles written in form of mathematical equations.	1,2,3,5
3. To apply dimensional analysis to predict physical parameters that influences the flow in fluid mechanics.	1,2,4,7,10

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	1st week	Basic concepts - Fluid properties - Basic hydrostatic equation	C & T
2	2nd week	Pressure at a point - Hydrostatic equations for incompressible and compressible fluids - Manometers	C & T
3	3rd week	Hydrostatic force on submerged plane and curved surfaces - Buoyancy and equilibrium of floating bodies	C & T

4	4th week	Metacentre - Fluid in rigid motion bodies.	C & T
5	5th week	Fluid dynamics; integral and differential formulations - Continuity equation	C & T
6	6th week	Euler equation – Bernoulli"s equation	C & T, Exp
7	7th week	Laminar and turbulent flows - Flow through pipes	C & T
8	8th week	Navier-Stokes equations	C & T
9	9th week	Some exact solutions of Navier-Stokes equations.	C & T
10	10th week	Fluid rotation and deformation - Stream function - Condition of Irrotationality - Governing equations of potential flow - Laplace equation	C & T
11	11th week	Basic potentional flow patterns. Lift and Kutta-Jukowslay Theorem	C & T
12	12th week	Boundary layer concept - Prandtl's equation - Drag on flat plates	C & T
13	13th week	Buckingham π-theorem - Dimensionless numbers.	C & T
14	14th week	Revision	C & T

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage (marks)
1.	Cycle Test - 1	February second week	60 Minutes	20
2.	Cycle Test – 2	March third week	60 Minutes	20
3.	Assignment, surprise tests, attendance & seminars	Once in two weeks	-----	20
5	End Examination	April Last week	150 Minutes	40
			Total	100

ESSENTIAL READINGS : **Textbooks, reference books Website addresses, journals, etc**

1. Fox, R.W. and Mc Donald, A.T., Introduction to Fluid Mechanics, 6th ed., John Wiley, 2003.

2. White, F.M., Fluid Mechanics, 5th ed., McGraw-Hill, 2003.

COURSE EXIT SURVEY

1. Feedback from the students during class committee meeting.
2. End semester feedback on Course Outcomes.

COURSE POLICY (Attendance, Assessment, academic honesty, etc.)

CORRESPONDENCE

1. All the correspondence (schedule of classes/schedule of assessment/ course material/ any other information regarding this course) will be done through their class representative.

ATTENDENCE

1. Attendance will be taken by the faculty in all contact hours.

2. Any student, who fails to maintain 75 % attendance need to appear for the compensation assessment (CPA). Student who scores more than 60 % marks in the CPA along with assessment criteria will be eligible for attending the end semester examination.

3. Students not having 75 % minimum attendance at the end of the semester and also fail in CPA (scoring less than 60 %) will have to REDO the course. (The assignment marks will not be considered).

ASSESSMENT

1. Attending all the assessments is **MANDATORY** for every student.

2. If any student is not able to attend any of the continuous assessments (CTs: 1 -2) due to genuine reason, student is permitted to attend the compensation assessment (CPA) with % weightage equal to maximum of the CTs. However, the maximum of % weightage among the assessments for which the student was absent will be considered for computing marks for continuous assessments. (This is not valid for students who have attendance lag.).

3. Finally, every student is expected to score minimum 40 % of the maximum mark of the class in the total assessment to pass the course. Otherwise the student would be declared fail and F grade will be awarded.

ACADEMIC HONESTY & PLAGIARISM

1. All the students are expected to be genuine during the course work. Taking of information by means of copying assignments, looking or attempting to look at another student's paper or bringing and using study material in any form for copying during any assessments is considered dishonest.

2. Preventing or hampering other students from pursing their academic activities is also considered as academic dishonesty.

FOR SENATE'S CONSIDERATION

Course Faculty _____ CC-Chairperson _____ HOD _____