

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Department of Chemical Engineering

COURSE OUTLINE			
Course Title	Momentum Transfer		
Course Code	CLPC14	No. of Credits	3
Department	Chemical Engineering	Faculty	Dr.M.Perumalsamy
Pre-requisites	None		
Course Type	Core course		
COURSE OVERVIEW			
<p>The Momentum Transfer course is offered for chemical engineering students in the third semester to acquire the knowledge of basic fluid dynamics and its applications in chemical engineering. The course content includes macroscopic and microscopic analysis and to use differential equations to understand pressure and velocity variations. Introduction to turbulence, concept of boundary layer, friction factor, pipe flow, pressure loss in fittings, flow past an immersed body, flow through packed &amp; fluidized beds</p>			
COURSE OBJECTIVES			
<ol style="list-style-type: none"><li>1. To impart the fundamental concepts of fluid statics, pressure distribution and dimensional analysis</li><li>2. To nurture the students to solve fluid dynamics problems using Newton's laws of motion.</li><li>3. To enable students to compute velocity profile, friction factor and head loss in pipes and fittings</li><li>4. To impart the knowledge of metering and transportation of fluids and fluid moving machinery performance</li></ol>			

### COURSE OUTCOMES (COs)

The students would have

1. the Knowledge of fundamental concepts in fluids statics and to use dimensional analysis for scaling experimental results
2. the ability to solve hydrostatic and fluid flow problems using Newton's laws of motion.
3. the ability to analyse frictional flow in pipes and piping networks and to compute the head loss and power requirements for fluids flow through channels
4. the ability to select the metering equipments and fluid moving machinery for an appropriate chemical engineering operations

### COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1.	First 2-3 weeks	Unit-I : Properties of fluids, concept of pressure and dimensional analysis	Lectures and power point presentation.
2.	Next 2-3 weeks	Unit II: Momentum Balance and their Applications	Lectures, Class room discussions.
3.	2-3 weeks	Unit-III: Flow of Incompressible Fluids Through Ducts	Lectures and tutorials
4.	2-3 weeks	Unit-IV: Flow past immersed objects	Lectures, power point and discussions

5.	2-3weeks	Unit-V: Measurement of fluid flow and Transportation of fluids	Lectures, power point and discussion
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### **COURSE ASSESSMENT METHODS**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle test I	On completion of first two Units	1Hr	20%
2	Cycle Test II	On completion of 3 <sup>rd</sup> and 4 <sup>th</sup> units	1 Hr	20%
3	Assignment ( 2 Nos)			Each 5 %
4	Semester exam	After completing the syllabus	3 Hrs	50 %

### **ESSENTIAL READINGS : Textbooks, reference books etc**

1. Noel. D.Nevers, "Fluid Mechanics for Chemical Engineers", McGraw Hill, 3<sup>rd</sup> International Edition, 2005.
2. W. L. McCabe, J.C. Smith and P. Harriott, "Unit operations of Chemical Engineering", 7<sup>th</sup> Edn., McGraw Hill, International Edn., 2004.
3. J. M. Coulson and J. F. Richardson, "Chemical Engineering", Vol 1, 6<sup>th</sup> Edn. Butterworth-Heinemann, 1999.

### **COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)**

- Performance in the assessment methods
- Questionnaire about the effectiveness of the delivery method, topics and the knowledge gained

### **COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)**

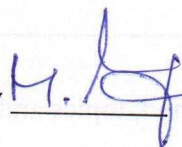
- 75 % attendance is mandatory.
- Those who indulge in malpractice such as copying, plagiarism shall have to redo the course.
- Those who are absent for any of the assessment tests on genuine grounds shall be given an opportunity only once for the retest with the prior permission of the concerned faculty member. The retest shall be conducted before the end semester exam and the portions will be combined portions of the cycle test I and II.
- A student has to score a minimum marks as per the institute norms to get a pass
- Those who fail in the course can appear for the supplementary exam. The total marks will be 100
- Those who absent for the end semester examination can appear for the supplementary exam. The total weightage for the examination is 50%. Internal assesemnt marks will be considered for the remaining 50% weightage marks.
- Any misbehavior, indiscipline in the classroom/exam hall will be dealt with seriously. In the worst case, the departmental disciplinary committee is empowered to debar the student from the course.

### **ADDITIONAL COURSE INFORMATION**

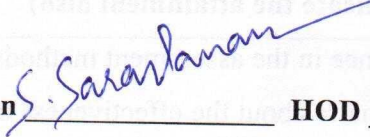
The lecture materials such as notes, video lectures shall be displayed in NIT-T moodle. The teachers can be contacted in person for clarifications by the student on a mutually convenient time.

### **FOR SENATE'S CONSIDERATION**

Course Faculty



CC-Chairperson



HOD

