

DEPARTMENT OF CHEMICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Course Title	Transport phenomena		
Course Code	CLPC29	No. of Credits	3
Course Code of Pre-requisite subject(s)	CLPC14, CLPC20, CLPC21,		
Session	July, 2018	Section (if, applicable)	A / B
Name of Faculty	Dr. N. Samsudeen	Department	Chemical Engineering
Email	samsudeen@nitt.edu	Telephone No.	04312503119
Name of Course Coordinator(s) (if, applicable)			
E-mail		Telephone No.	
Course Type	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Laminar Flow: Velocity distribution in Laminar flow - Shell momentum balances - Flow through tubes, surfaces. Flow of non - Newtonian fluids.</p> <p>Equation of Motion: Equation of change for isothermal process – One dimensional equation of motion and continuity - Euler and Navier – Stokes equation. Dimensional analysis of equation of change.</p> <p>Turbulent Flow: Velocity distribution in turbulent flow - Semi empirical expressions for Reynolds stress. Interphase transport in isothermal system - Ergun's equation.</p> <p>Heat Transfer analysis: Temperature distribution in solids and fluids in laminar flow - Equations of change for multi component systems.</p> <p>Mass Transfer analysis: Concentration distribution in solids and in fluids laminar flow - Equations of change for multi component systems.</p> <p>REFERENCE BOOKS</p> <ol style="list-style-type: none"> 1. Bird R.B., Stewart W.E. and Light Foot E.N. Transport Phenomena, 2nd Edition, John Wiley and Sons., 2007. 2. Geankoplis C.J., Transport Processes and Separation Process Principles, 4th Edition, Prentice Hall Inc., 2009. 3. J.L. Stuart, "Transport Phenomena", John Wiley, New York, 1982 4. W. J. Thomson, "Introduction to Transport Phenomena", Prentice Hall, 2000 			

COURSE OBJECTIVES

1. To find the velocity distribution in laminar and turbulent flow of Newtonian and nonNewtonian fluid
2. To obtain the temperature and concentration profiles in solids and in fluids respectively.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Understand the analogy among momentum, heat and mass transport	PO1, PO3, PO4, PO7, PO8, PO11, PO12
2. Develop differential momentum, heat, and mass balances for 1-D steady state problems using conservation principles	PO1, PO3, PO4, PO9, PO11, PO12
3. Formulate a mathematical representation of velocity, temperature and concentration profiles in momentum, heat and mass transfer respectively in laminar flow	PO1, PO2, PO3, PO4, PO9, PO11, PO12
4. Identify the similarity among the correlations for flow, heat and mass transfer at interface	PO1, PO2, PO3, PO4, PO11, PO12
5. Solve the flow, heat and mass transfer problems	PO1, PO2, PO3, PO4, PO8, PO9, PO11, PO12

COURSE PLAN – PART II**COURSE OVERVIEW**

Transport phenomena deals with fluid flow behavior as well as heat transfer and mass transfer behavior when the fluid flow through any system. This course is offered in Seventh semester to chemical engineering students. This course has three credits.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/ Contact Hours	Topic	Mode of Delivery
1	10	Laminar Flow: Velocity distribution in Laminar flow - Shell momentum balances - Flow through tubes, surfaces. Flow of non - Newtonian fluids.	Chalk and Talk, PPT
2	7	Equation of Motion: Equation of change for isothermal process – One dimensional equation of motion and continuity - Euler and Navier – Stokes equation. Dimensional analysis of equation of change.	Chalk and Talk,
3	7	Turbulent Flow: Velocity distribution in turbulent flow - Semi empirical expressions for Reynolds stress. Interphase transport in isothermal system - Ergun's equation.	Chalk and Talk, PPT
4	7	Heat Transfer analysis: Temperature distribution in solids and fluids in laminar flow - Equations of change for multi component systems.	Chalk and Talk, PPT

5	7	Mass Transfer analysis: Concentration distribution in solids and in fluids laminar flow - Equations of change for multi component systems.	Chalk and Talk, PPT
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COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Frist Assessment	After 15 th contact hours	1 hour	20
2	Second Assessment	After 30 th contact hours	1 hour	20
3	Assignment -I	Before first assessment		5
4	Assignment- II	Before second assessment		5
CPA	Compensation Assessment*	After 35 th contact hours	1 hour	20
6	Final Assessment *		3 hours	50

***mandatory; refer to guidelines on page 4**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

Feedback from students at the end of the each assessment

COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, , academic honesty and plagiarism etc.)

MODE OF CORRESPONDENCE (email/ phone etc). Students may be contacted to my mail id (samsudeen@nitt.edu) WhatsApp (9894182441) for queries related to subjects.

ATTENDANCE

- At least 75% attendance is mandatory.
- The students with less than 75% by the end of 35th contact hours will be identified and complementary assignments may be given to them to be done during 36th to 38th hours.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade

COMPENSATION ASSESSMENT

All Assessments are compulsory. If a student fails to attend any one assessment due to genuine reasons, He/She may be permitted to appear for compensation assessment. If the students absent in both assessment I & 2, He/She may not be permitted in compensation assessment.

ACADEMIC HONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee constituted with the faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the

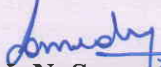
punishment if the student is found guilty. The report shall be submitted to the Academic office.


➤ The policy against academic dishonesty shall be applicable for the current batches also.

ADDITIONAL INFORMATION

Apart from the books mentioned in the syllabus, students may follow any other resources such as Heat transfer, Fluid mechanics and mass transfer books to boost their knowledge in Transport phenomena

FOR APPROVAL


Dr. N. Samsudeen
Course Faculty

CC-Chairperson  HOD 