Semester Plan
(Theory)

TCET/FRM/IP-02/09 **Revision: A**

Semester: V **Course: MECH**
Subject: MEC505:Heat Transfer **Class: TE MECH -A**

Sr.No.	Prerequisite/ Bridge course:	Duration (Week /Hrs)	Modes of Learning	Recommended Sources
1	First law of thermodynamics, second law of thermodynamics, Zeroth law of thermodynamics, Concept of entropy,enthalpy, Newtons law of viscocity, hydrodynamic boundary layer, Boundary layer theory, Laminar and turbulant flow, Flow through pipes	6 hours	Self Learning/ Revision	**Textbooks:** 1. Applied Thermodynamics: P.K.Nag 2. Thermal Engineering : R.K. Rajput

Class Room Teaching

Sr. No	Module No.	Lesson No	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
1		L1.1	SOP-Theory,Introduction to Heat Transfer,	Power point presentation, Chalk & Board	10/7/2017	1.1 1.2 1.3 1.4 1.5	
2	-	L1.2	SOP-OBE: Application of Heat Transfer	Power point presentation, Chalk & Board	12/7/2017	1.1 1.2 1.6 1.7 1.8	
1	Module 1	L1.3	Typical heat transfer situations	Power point presentation, Chalk & Board	13/7/2017	1.2 1.3 1.4 1.5	
2	Module 1	L1.4	Modes of heat transfer,heat transfer parameters, various thermo physical properties	Power point presentation, Chalk & Board	14/7/2017	1.2 1.6 1.7 1.8	
3	Module 2	L2.1	Fourier's law of heat conduction	Power point presentation, Chalk & Board	17/7/2017	1.1	
4	Module 2	L2.2	Thermal conductivity	Power point presentation, Chalk & Board	18/7/2017	1.1	
5	Module 2	L2.3	Differential equation of heat conduction with heat generation in unsteady state in the cartesian coordinate system	Power point presentation, Chalk & Board	21/7/2017	1.1	
6	Module 2	L3.1	Boundary and initial conditions, solution to three dimensional steady heat conduction problems	Power point presentation, Chalk & Board	24/7/2017	1.1	
7	Module 2	L3.2	Steady heat conduction in plane walls, composite walls	Chalk & Board, Animation	26/7/2017	1.1	
8	Module 2	L3.3	Concept of thermal resistance and thermal resistance network	Chalk & Board, Animation	27/7/2017	1.1	
9	Module 2	L3.4	Heat conduction in cylinders and spheres	Chalk & Board, Animation	28/7/2017	1.1	
10	Module 2	L4.1	D.E. of heat conduction in cylindrical co- ordinates, conduction through cylindrical and spherical system	Chalk & Board, Animation	31/7/2017	1.1	

11	Module 2	L4.2	Critical thickness/radius of insulation and its importance.	Power point presentation, Chalk & Board	2/8/2017	1.1	
12	Module 2	L4.3	Heat transfer from finned surfaces	Chalk & Board, Animation	3/8/2017	1.1	
13	Module 3	L4.4	Types of fins	Chalk & Board, Animation	4/8/2017	1.1	
14	Module 3	L5.1	Fin equation for rectangular fin and its solution	Power point presentation, Chalk & Board	7/8/2017	1.1	
15	Module 3	L5.2	Fin efficiency, Fin effectiveness	Chalk & Board, Animation	9/8/2017	1.1	
16	Module 3	L5.3	Lumped system analysis	Chalk & Board, Animation	10/8/2017	1.1	
17	Module 3	L5.4	One dimensional transient problems analytical solutions	Power point presentation, Chalk & Board	11/8/2017	5.8.7	
18	Module 3	L6.1	One dimensional Heisler charts	Power point presentation, Chalk & Board	14/8/2017	1.1	
19	Module 3	L6.2	Importance of numerical methods, Finite difference formulation of one dimensional steady heat conduction equations	Chalk & Board, Animation	16/8/2017	1.1	
20	Module 3	L6.3	Time constant of thermocouple	Chalk & Board, Animation	18/8/2017	1.3	
21	Module 4	L7.1	Physical mechanism of convection	Power point presentation, Chalk & Board	24/8/2017	1.3	
22	Module 4	L8.1	Natural and Forced convection	Power point presentation, Chalk & Board	30/8/2017	1.3	
23	Module 4	L8.2	Velocity/hydrodynamic and Thermal boundary layer,Velocity and temperature profile	Chalk & Board, Animation	31/8/2017	1.3	
24	Module 4	L8.3	Pipes of other cross sections, Heat transfer in laminar and turbulent flow over a flat plate	Chalk & Board, Animation	1/9/2017	1.3	
25	Module 4	L9.1	Heat pipe introduction and applications	Power point presentation, Chalk & Board	4/9/2017	1.3	
26	Module 4	L9.2	Principles of dimensional analysis and its application in convective heat transfer	Power point presentation, Chalk & Board	6/9/2017		
27	Module 4	L9.3	Principles of dimensional analysis and its application in convective heat transfer	Power point presentation, Chalk & Board	7/9/2017		
28	Module 4	L9.4	Empirical correlations for convection	Power point presentation, Chalk & Board	8/9/2017		
29	Module 4	L10.1	Empirical correlations for convection	Power point presentation, Chalk & Board	11/9/2017		

30	Module 4	L10.2	Thermal radiation, Blackbody radiation, Radiation intensity, Radiative properties	Power point presentation, Chalk & Board	13/9/2017		
31	Module 5	L10.3	Basic laws of radiation (Plank's law, Kirchoff's law, Stefan-Boltzman law, Wien's displacement law, Lambert's cosine law		14/9/2017		
32	Module 5	L10.4	Radiation exchange between black surfaces	Power point presentation, Chalk & Board	15/9/2017		
33	Module 5	L11.1	Shape factor-I	Power point presentation, Chalk & Board	18/9/2017		
34	Module 5	L11.2	Shape factor-II	Power point presentation, Chalk & Board	20/9/2017		
35	Module 5	L11.3	Radiation exchange between gray surfaces	Power point presentation, Chalk & Board	21/9/2017		
36	Module 5	L11.4	Radiosity- Irradiation method	Power point presentation, Chalk & Board	22/9/2017		
37	Module 5	L12.1	Radiation shield and the radiation effect	Power point presentation, Chalk & Board	25/9/2017		
38	Module 5	L12.2	Boiling heat transfer, Pool boiling, Flow boiling,	Power point presentation, Chalk & Board	27/9/2017		
39	Module 6	L12.3	Condensation heat transfer, Film condensation, Drop wise condensation	Power point presentation, Chalk & Board	28/9/2017		
40	Module 6	L12.4	Types of heat exchangers	Power point presentation, Chalk & Board	29/9/2017		
41	Module 6	L13.1	Overall heat transfer coefficient,	Power point presentation, Chalk & Board	4/10/2017		
42	Module 6	L13.2	Analysis of heat exchanger	Power point presentation, Chalk & Board	5/10/2017		
43	Module 6	L13.3	LMTD method	Power point presentation, Chalk & Board	6/10/2017		
44	Module 6	L13.4	LMTD method	Power point presentation, Chalk & Board	7/10/2017		
45	Module 6	L13.5	Effectiveness-NTU method	Power point presentation, Chalk & Board	7/10/2017		
46	Module 6	L14.1	Effectiveness-NTU method	Power point presentation, Chalk & Board	12/10/2017		

47	Module 6	L14.2	Correction factor of HE, Plate type Heat exchanger, Shell and tube heat exchanger	Power point presentation, Chalk & Board	13/10/2017		
48	Module 6	L15.1	Numerical methods in heat transfer	Power point presentation, Chalk & Board	16/10/2017		
49	-	L15.2	Revision, Practice problems	Power point presentation, Chalk & Board	16/10/2017		
50	-	L15.3	Revision, Practice problems	Power point presentation, Chalk & Board	16/10/2017		
Remark:Total 50 leacture							
Course: TE MECH		Syllabus Coverage: Planned :50 Completed:		Practice Session: 2		**Content Beyond Syllabus:** Dimensional Analysis,plate type heat exchanger	
No. of (lectures planned)/(lecture taken): 49							

Sr.No.	Advanced Bridge course:	Duration (Week	Modes of	Recommended Sources
	Energy Conservation and Waste heat Recovery	36 Hours	Online course videos with Hands on Training	**Web sources:** 1. https://onlinecourses.nptel.ac.in/noc17_mm17/preview **Textbook reference:** 1. "Energy and Thermal Management, Air Conditioning, Waste Heat Recovery",edited by Christine Junior, Daniel Jänsch, Oliver

Text Books:

1.1 Introduction to Thermodynamics and Heat Transfer, 2nd ed., Yunus A Cengel, McGraw Hill International.

1.2 Heat and Mass Transfer, R K Rajput, S.Chand and Company

1.3 Heat and Mass Transfer, 2nd ed., R Rudramoorthy and L Mayilsamy, PEARSON

1.4 Fundamentals of Engineering Heat and Mass Transfer, 4th ed., R C Sachdeva, New Age International

Reference Books:

1.6Heat Transfer, Y V C Rao, University Press.

1.7 Fundamentals of Heat and Mass Transfer, F. P. Incropera and D. P.DeWitt, Wiley India.

Digital Reference:

3.1 www.nptel.ac.in

3.2 http://www.e-booksdirectory.com/details.php?ebook=5286

Name & Signature of Faculty Signature of HOD Signature of Principal /Dean (Academics)

Date: Date: Date:

Note:

1. Plan date and completion date should be in compliance
2. Courses are required to be taught with emphasis on resource book, course file, text books, reference books, digital references etc.
3. Planning is to be done for 15 weeks where 1st week will be AOP, 2nd -13th for effective teaching and 14th -15th week for effective university examination oriented teaching, mock practice session and semester consolidation.
4. According to university syllabus where lecture of 4 hrs/per week is mentioned minimum 55 hrs and in case of 3 lectures per week minimum 45 lectures are to be engaged are required to be engaged during the semester and therefore accordingly semester planning for delivery of theory lectures shall be planned.
5. In order to improve score in NBA, faculty members are also required to focus course teaching beyond university prescribed syllabus and measuring the outcomes w.r.t learning course and programme objectives.
6. Text books and reference books are available in syllabus. Here only additional references w.r.t. non –digital/ digital sources can be written (if applicable)
7. Technology to be used in class room during lecture shall be written below the topic planned within the bracket.

5. In order to improve score in NBA, faculty members are also required to focus course teaching beyond university prescribed syllabus and measuring the outcomes w.r.t learning course and programme objectives.
6. Text books and reference books are available in syllabus. Here only additional references w.r.t. non –digital/ digital sources can be written (if applicable)
7. Technology to be used in class room during lecture shall be written below the topic planned within the bracket.