

## Syllabus for B.Tech – Energy Engineering

<b>Course Number &amp; Title:</b> EN210 Thermo Fluid and Heat Transfer Laboratory	
<b>L-T-P-C:</b> 0-0-3-3	
<b>Offered in</b> (Odd/ Even / Any): Semester IV	
<b>Pre-Requisite:</b> Nil	
Preamble / Objectives (Optional): To provide comprehensive knowledge on different aspects of heat transfer, fluid mechanics and thermodynamics.	
Course Content/ Syllabus: Modes of heat transfer, first and second law of thermodynamics, laminar and turbulent flow, viscous and inviscid flows, phase change heat transfer, refrigeration cycles, compressible flow, Bernoulli's equation, wet and dry bulb temperature, flowmeter devices	
List of Experiments:	
1)	Determination of thermal conductivity of a composite wall
2)	Determination of Stefan-Boltzmann's constant
3)	Heat pipe demonstration
4)	Convective heat transfer experiment
5)	Bernoulli's theorem proof
6)	Reynold's number determination
7)	Free vortex and forced vortex (rotating fluid mass)
8)	Hydraulic coefficient for an orifice
9)	Thermocouple calibration with constant temperature bath
10)	Vapor Compression Refrigeration cycle
11)	Investigation of performance characteristics of 2- stage Air Compressor
12)	Boiling & condensation
13)	Wet & dry bulb temp
14)	Joule-Thompson experiment
Books (In case UG compulsory courses, please give it as "Text books" and "Reference books".	
Text Books: (Format: Authors, <i>Book Title in Italics font</i> , Volume/Series, Edition Number, Publisher, Year.)	
1.	Y A Cengel, J Cimbala and A Ghajar, <i>Fundamentals of Thermal-Fluid Sciences</i> , McGraw-Hill, New York, 6 <sup>th</sup> Edition, 2021.
2.	F P Incropera, D P Dewitt, T L Bergman and A S Lavine, <i>Fundamentals of Heat and Mass Transfer</i> , 8 <sup>th</sup> Edition, John Wiley & Sons, 2018.
Reference Books: (Format: Authors, <i>Book Title in Italics font</i> , Volume/Series, Edition Number, Publisher, Year.)	
1.	S K Som, G Biswas and S Charkaborty. <i>Introduction to Fluid Mechanics and Fluid Machines</i> , 3 <sup>rd</sup> Edition, McGraw-Hill Education, 2017.