

Course code	Course Name	L-T-P - Credits	Year of Introduction
ME222	THERMAL ENGINEERING II	4-0-0-4	2016
Prerequisite : ME207 Thermal engineering - I			
Course Objectives: <ul style="list-style-type: none"> To acquire knowledge on the working of IC engines, Refrigerators, Air conditioners and heat exchangers. To introduce the combustion process in IC engines To understand air pollution from IC engines and its remedies. 			
Syllabus: Fuels and combustion- Normal and abnormal combustion in IC engines- Alternate fuels in IC engines- Performance testing of IC engines -IC engine pollution- Heat exchangers- Refrigeration and Air conditioning.			
Expected outcome: At the end of the course the students will be able to <ol style="list-style-type: none"> Integrate the concepts, laws and methodologies from the course in thermodynamics into analysis of cyclic processes To apply the thermodynamic concepts into various thermal application like IC engines, Refrigeration and air conditioning, Heat exchangers. 			
Text Books: <ol style="list-style-type: none"> Rudramoorthy , Thermal Engineering, Tata McGraw Hill Education India, 2003 R.K Rajput, Thermal Engineering, Laxmi publications,2010 Rathore, Thermal Engineering 1e, Tata McGraw Hill Education India, 2010 			
References Books: <ol style="list-style-type: none"> V. Ganesan, Fundamentals of IC engines, Tata McGraw-Hill,2002 T.D. Eastop and A McConkay, Applied thermodynamics for engineering technology, Pearson education,1996 J.B.Heywood, I.C engine fundamentals. McGraw-Hill,2011 Gill, P.W., Smith, JR., J.H., and Ziurys, E.J Fundamentals of internal combustion engines Oxford and IBH,1959 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Fuels and combustion- Stoichiometry, calculation of A/F ratio and equivalence ratios, volumetric and gravimetric analysis, fuel properties.	9	15%
II	Combustion in IC engines- Normal and abnormal combustion in SI and CI engines, auto ignition- pre ignition and detonation- factors affecting detonation, knocking in engine.	9	15%
FIRST INTERNAL EXAMINATION			

III	Performance testing of IC Engines, Alternate fuels in IC engines- biodiesel, hydrogen, natural gas, LPG, Alcohol- IC engine pollution and control, Emission norms	9	15%
IV	Heat Exchangers- Different types- LMTD and effectiveness. Problems	9	15%
SECOND INTERNAL EXAMINATION			
V	Refrigeration- Vapor compression refrigeration system, Vapor absorption refrigeration system, simple cycle- TS and PH diagrams- COP- Refrigerants and their properties- Eco friendly refrigerants. Application of refrigeration- Domestic refrigerators, Water coolers, ice plants	9	20%
VI	Air conditioning- Psychrometry-Comfort and industrial air conditioning, Working of room air conditioners- Use of psychrometric charts- Split and packaged system- Automobile airconditioning.	9	20%
END SEMESTER EXAM			

Question Paper Pattern

Max. marks: 100

Time: 3 hours

The question paper should consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.