

GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE : **ME208**

SUBJECT NAME : **THERMODYNAMICS AND I. C. ENGINES**

FACULTY NAME : **ASHOK KUMAR GOYAL**

DESIGNATION : **LECTURER (MECHANICAL)**

TOPIC	LECTURE / PRACTICAL CLASSES REQUIRE	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
Basic Concept and Gas Laws :	1	AUG.15			
Thermodynamics, property-Intensive and Extensive, system - open, closed and isolated	1	AUG.15			
Energy - Internal energy, potential energy, kinetic energy, heat, work, specific heat, enthalpy	1	AUG.15			
Boyle's law, Charle's law, Joule's law	1	AUG.15			
Characteristics gas equation, gas constant, mol, universal gas constant and molar specific heats	1	SEP.15			
Simple numerical problems	2	SEP.15			
Laws of Thermodynamics: Zeroth law of thermodynamics First law of thermodynamics.	1	SEP.15			
Second law of thermodynamics Concept of entropy Constant volume, constant pressure, isothermal, adiabatic polytropic processes, throttling and free expansion, work done during these processes.	2	SEP.15			
Simple numerical problems	2	SEP.15			
Availability : Available and unavailable energy Effectiveness	2	OCT.15			
Formation of Steam and its Properties : Generation of steam at constant pressure, various stage of steam- wet steam, dry steam saturated steam, dryness fraction, super heated steam, degree of super	2	OCT.15			
Critical point, triple point, thermodynamic properties of steam - specific volume, specific enthalpy, specific internal energy, specific entropy	1	OCT.15			
Steam property diagram: temperature - entropy diagram, enthalpy- entropy diagram, pressure - enthalpy diagram	1	OCT.15			
Heating and expansion of steam during thermodynamic processes, Change of internal energy and entropy of steam during processes	2	NOV.15			
Simple numerical problems Use of steam tables and Mollier charts	2	NOV.15			
Steam Generators: Definition of boiler according to I.B.R., classification of boilers, Comparison of water tube and fire tube boilers.	2	NOV.15			
Special characteristics of high-pressure boilers Introduction to Indian Boiler Act.	1	Dec-15			
Boiler Performance: Actual evaporation, Equivalent evaporation, Factor of evaporation, Boiler efficiency	1	Dec-15			
Heat losses in boiler plants, Boiler power, Energy balance sheet of boiler	1	Dec-15			
Simple numerical problems	2	Jan-16			
Gas Power Cycles: Otto cycle, Diesel cycle, Dual combustion cycle, Atkinson cycle, Joule / Brayton cycle	2	Jan-16			
Air standard efficiency Effect of compression ratio on efficiency	1	Jan-16			
Numerical Problems	1	Jan-16			

Principles of Internal Combustion Engines : Introduction and Classification of I.C Engines	1	Jan-16			
Working principle of four stroke and two stroke cycle and their comparison	1	Feb-16			
Working and special features of petrol and diesel engines and their comparison and applications	1	Feb-16			
I.C. engine terms - Bore, stroke, dead centres, crank throw, compression ratio, clearance volume, piston displacement and piston speed	1	Feb-16			
Valve timing diagrams (Theoretical & Actual), firing order	1	Feb-16			
Super charging of I.C. engines	1	Feb-16			
Petrol Engines : Concept of Carburation, Air fuel ratio Simple carburetors and its limitations Description of Solex carburetors Multi point fuel injection system Mechanical and electrical feed pump Description of coil ignition system and Magneto ignition system	2	Feb-16			
Diesel Engines Description and working of Fuel feed pump Injection of fuel, air and airless injection and fuel injectors Introduction to swirl and open combustion chambers	2	Feb-16			
Cooling, Lubrication and Governing :Necessity of engine cooling Properties of coolants Methods of cooling and their merits and demerits Function of Lubrication, lubrication systems of I.C. Engines Properties of lubricants	2	Mar-16			
I.C. Engines Performance Introduction to basic performance parameters Measurement of brake power by rope brake, prony brake and hydraulic dynamometer Measurement of Indicated power by engine indicator and Morse test method. Energy balance sheet of I.C. engines and finding various efficiencies Numerical problems	2	Mar-16			
Gas Turbines (No numerical problem): Classification and application of gas turbines Description of constant pressure (open cycle and closed cycle) and constant volume gas turbines. Methods of increasing thermal efficiency of gas turbines, regeneration, inter cooling, re-heating.	2	Mar-16			
Air Compressors (No numerical problem): Classification of compressors, uses of compressed air Description of single stage and multi stage reciprocating compressors P.V. diagram of single and multi stage reciprocating compressor with inter cooling Description of rotary and centrifugal compressors	2	Mar-16			
TOTAL	51				

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SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE : **ME208(P)**

SUBJECT NAME : **THERMODYNAMICS AND I. C. ENGINES**

FACULTY NAME : **ASHOK KUMAR GOYAL**

DESIGNATION : **LECTURER (MECHANICAL)**

TOPIC	LECTURER / PRACTICAL CLASSES	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
Study by models/charts/actual units of the following: Cochrans boiler Lancashire boiler Babcock & Wilcox boiler Boiler mountings Boiler accessories Lamont boiler Benson boiler Schmidt Hartmann boiler	5	AUG15, SEP,15 & OCT15			
Study of Two-stroke and Four stroke petrol engine.	1	Nov-15			
Study of 4-stroke diesel engine	1	Nov-15			
Study of carburetors	1	Dec-15			
Study of MPFI system of petrol engine	1	Jan-16			
Dismantling and Assembly of - A. C. mechanical and electrical feed pumps of a petrol engine	1	Jan-16			
Dismantling and assembly of diesel engine fuel pumps and injector.	1	Feb-16			
To draw the energy balance sheet of diesel engine. Find I.P. determining various efficiencies	1	Feb-16			
To draw energy balance sheet of a multi cylinder petrol engine (I.P. by Morse test).	1	Mar-16			
Study of an air compressor.	1	Mar-16			
TOTAL	14				

GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE : **ME305**

SUBJECT NAME : **POWER GENERATION**

FACULTY NAME : **ASHOK KUMAR GOYAL**

DESIGNATION : **LECTURER (MECHANICAL)**

TOPIC	LECTURE / PRACTICAL CLASSES REQUIRE	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
Introduction : Different types of conventional sources of energy Base load and peak load plants	1	AUG.15			
Scope of conventional energy sources in India Status of conventional power plants in India	1	AUG.15			
Thermal Power Plants : General layout and working	1	AUG.15			
Factors of site selection Methods of coal handling	2	SEP.15			
Unloading devices	2	SEP.15			
Ash handling system Concept of super thermal power plants	2	SEP.15			
Combustion equipment	4	SEP.15 & OCT.15			
Hydro-Electric Power Plant : Advantages and application of hydroelectric power plants	1	OCT.15			
Elements of hydroelectric power plant	1	OCT.15			
Plant layout of low head and high head intake Combination of Hydel – Thermal power plants	2	OCT.15			
Hydro electric power plants in India.	1	OCT.15			
Nuclear Power Plant : Introduction to nuclear reactions and nuclear fuels	1	OCT.15			
Site selection of nuclear power plants Nuclear reactors : various elements of nuclear	2	NOV.15			
Comparison of nuclear power plant with thermal and hydel power plants Common types of nuclear reactors	3	NOV.15			
Nuclear power plants in India Hazards in nuclear power plants and safety measures Nuclear waste disposal	3	NOV.15			
Diesel Power Plants : Elements of a diesel power plant	1	DEC.15			
Building and general layout	1	DEC.15			
Use of diesel engine with steam power plants Applications of diesel power plants Limitation of diesel power plants	2	DEC.15			
Gas Turbine Plants : Classification and application	1	JAN.16			
Elementary description of gas turbines Details of elements of a gas turbine plant and plant layout	2	JAN.16			
Advantages over thermal and diesel power plants	1	JAN.16			
Power Plant Economics : Elements of cost of power	1	JAN.16			
Factors affecting economics of generation and distribution of power	1	JAN.16			
Factors affecting choice and type of power plants on economics of power generation	2	FEB.16			

Simple numerical problems on cost of power generation	2	FEB.16			
Renwal Energy Sources :	1	FEB.16			
Present position of conventional energy sources in					
Need for non-conventional energy sources	1	FEB.16			
Various alternate energy sources – solar, biogas, wind, geothermal, tidal, Magneto hydro dynamic, thermo electric power etc.	1	FEB.16			
Solar Energy :	1	FEB.16			
Introduction to solar power					
Solar energy Collectors	1	MARCH.16			
Application of solar energy	1	MARCH.16			
Solar energy storage	2	MARCH.16			
Wind Energy :	1	MARCH.16			
Scope of wind energy					
Merits and demerits of wind energy	2	MARCH.16			
Measurement of wind velocity by Anemometer :					
Indicating and recording type					
Wind Machines					
Wind power and energy pattern factor	2	MARCH.16			
Efficiency of wind machine					
Site selection of wind machine					
TOTAL	54				