FR. Conceicao Rodrigues College Of Engineering
Father Agnel Ashram, Bandstand, Bandra-west, Mumbai-50
Department of Production Engineering

T.E. (Production) (semester V) (2018-2019)

Lecture Plan

Subject: Internal combustion engines (PEDLO5011) **Credits-03**

1. **Syllabus.**

Module	Contents	Hrs.
01	**Introduction to IC Engines and cycle analysis:** Basic of I.C. Engines, Details of two stroke and four stroke engines, Valve timing diagram, Air standard cycles, Fuel air cycle and actual cycle. Variation in specific heat, Dissociation and their effect on engine performance. Review of other losses in IC engines.	**07**
02	**Spark Ignition Engines** **Fuel Supply System in S I Engines :** Theory of Carburetion, Types of carburetors, Electronic fuel injection system (MPFI), **Combustion in Spark Ignition Engines:** Stages of combustion, ignition lag, flame propagation, factors affecting flame propagation, abnormal combustion, phenomenon of detonation in SI engines, effect of engine variables on detonation. Combustion chambers. Rating of fuels in SI engines.	**07**
03	**Compression Ignition Engines** **Fuel supply system in CI Engine:** Air injection systems, Airless/solid injection systems, individual pump, Common rail and distributor system, unit injector etc, types of fuel pump, injector and nozzles. Electronically controlled fuel injection system **Combustion in compression ignition engines (CI):** Stages of combustion, ignition delay, factors affecting delay period, phenomenon of knocking in CI engine, effect of engine variables on knocking, comparison of knocking in SI & CI engines, types of combustion chambers, rating of fuels in CI engines,	**07**
04	**Engine systems and components** **Engine lubrication** : Types of lubricants and their properties, SAE rating of lubricants, Types of lubrication systems	**07**

	Engine Cooling: Necessity of engine cooling, disadvantages of overcooling, Cooling systems and their comparison: Air cooling, Liquid cooling. **Supercharging/Turbo-charging**: Objectives, Effects on power output and engine efficiency, Methods, Types and Limitations.	
05	**Testing and Performance of engines:** Measurement of indicated power, brake power, fuel consumption and emission, Measurement of friction power by Willan's Line Method* and Morse Test*, calculation of brake thermal efficiency, brake power and brake specific fuel consumption of I.C Engines, variable compression ratio engines, heat balance sheet of I.C Engines (Numerical on Performance and Heat balance sheet of I.C Engine)	**08**
06	**Engine Emission and Control** S.I. engine emission (HC, CO, NOx) Control methods- Evaporative (ELCD), Thermal, Catalytic converters, C.I. Engines Emission (CO, NOx, Smog, Particulate), Control methods- Chemical, EGR. Standard pollution norms like EURO, Bharat, Introduction to alternative fuels for I.C. engines,	**06**

2. **CO Statements.**

Learner will be able to

PEDL05011	Analyis fuel supply system and igneation system of IC engine
PEDL05011	Determine the centroid of plane lamina
PEDL05011	Distinguish combustion process of CI and SI engine
PEDL05011	Measure operating characteristics of IC engines
PEDL05011	Analyis the imapct of vehicular pollution and way to reduce or control the pollution
PEDL05011	Illustrate various pollution norms likeEURO, BHARAT of IC engine .

CO-PO-PSO Mapping.

CO# / PO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEC603.1	3	2	-	-	-	-	-	-	-	-	-	-
PEC603.2	3	3	2	-	-	-	-	-	-	-	-	-
PEC603.3	3	3	-	-	-	-	-	-	-	-	-	-
PEC603.4	3	3	-	-	-	-	-	-	-	-	-	-
PEC603.5	3	3	-	-	-	-	-	-	-	-	-	-
PEC603.6	3	3	-									

CO# / PSO#	PSO1	PSO2
PEC603.1	-	-
PEC603.2	-	-
PEC603.3	-	-
PEC603.4	-	-
PEC603.5	-	-
PEC603.6	-	-

3. **CO Assessment tools with target.**

Co Statement #	**Target for Assessment Tools**		
	Unit Test	**End Semester Exam**	**Course Exit Survey**
PEC402.1	60%	50%	60%
PEC402.2	60%	50%	60%
PEC402.3	60%	50%	60%
PEC402.4	60%	50%	60%
PEC402.5	60%	50%	60%
PEC402.6	60%	50%	60%

4. Curriculum Gap/Content beyond syllabus (if any).

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5. Lecture/Lab/Mini Project/Assignment Plan.

T.E PRODUCTION (2018-2019)		
Lesson plan for I.C.Engine		
SR.	**Date**	**Plan topic**
1	16-07-2018	Introduction to IC Engines and cycle analysis: Basic of I.C. Engines,
2	18-07-2018	Details of two stroke and four stroke engines, Valve timing diagram,
3	19-07-2018	Air standard cycles, Fuel air cycle and actual cycle. Variation in specific
4	23-07-2018	heat, Dissociation and their effect on engine performance. Review of
5	25-07-2018	other losses in IC engines.
6	26-07-2018	Spark Ignition Engines
7	30-07-2018	Fuel Supply System in S I Engines :

8	01-08-2018	Theory of Carburetion, Types of carburetors, Electronic fuel injection
9	02-08-2018	system (MPFI),
10	06-08-2018	Combustion in Spark Ignition Engines: Stages of combustion,
11	08-08-2018	ignition lag, flame propagation, factors affecting flame propagation,
12	09-08-2018	abnormal combustion, phenomenon of detonation in SI engines
13	13-08-2018	**U.T.1**
14	15-08-2018	**U.T.1**
15	16-08-2018	**U.T.1**
16	22-08-2018	**Bakri EID**
17	23-08-2018	Effect of engine variables on detonation. Combustion chambers.
18	24-08-2018	fuels in SI engines.
19	29-08-2018	Compression Ignition Engines
20	30-08-2018	Fuel supply system in CI Engine: Air injection systems, Airless/solid
21	31-08-2018	injection systems, individual pump, Common rail and distributor
22	05-09-2018	system, unit injector etc, types of fuel pump, injector and nozzles.
23	06-09-2018	Electronically controlled fuel injection system
24	07-09-2018	**Synergy**
25	12-09-2018	Combustion in compression ignition engines (CI)
26	13-09-2018	**Ganesh chaturthi**
27	14-09-2018	**Mid term break**
28	19-09-2018	Stages of combustion, ignition delay, factors affecting delay period
29	20-09-2018	**Moharam**
30	21-09-2018	of knocking in CI engine, effect of engine variables on knocking,
31	26-09-2018	comparison of knocking in SI & CI engines, types of combustion
32	27-09-2018	chambers, rating of fuels in CI engines,

33	28-09-2018	**Engine systems and components**
34	03-10-2018	**Engine lubrication** : Types of lubricants and their properties, SAE
35	04-10-2018	rating of lubricants, Types of lubrication systems
36	05-10-2018	**Engine Cooling**: Necessity of engine cooling, disadvantages of over cooling
37	10-10-2018	**U.T.2**
38	11-10-2018	**U.T.2**
39	12-10-2018	overcooling, Cooling systems and their comparison: Air cooling,
40	15-10-2018	Liquid cooling.
41	17-10-2018	**Supercharging/Turbo-charging**: Objectives, Effects on power output
42	18-10-2018	**Dasara**