

DEPARTMENT OF PRODUCTION TECHNOLOGY
MADRAS INSTITUTE OF TECHNOLOGY CAMPUS
ANNA UNIVERSITY: : CHENNAI – 600 044.

COURSE PLAN

COURSE DETAILS:

Degree	B.E.		
Programme Name	Production Engineering		
Course Code & Title	PR5072 PRODUCTION OF AUTOMOTIVE COMPONENTS		
Credits	3	Session	Jan 2024 – May 2024
Course Type	Theory/ Theory-with Lab/ Lab	Section	
Name of the Faculty	Dr.C. NANDAKUMAR Associate Professor Department of Production Technology MIT, Anna University, Chennai – 600044.		

COURSE CONTENT:

Syllabus: (Approved Syllabus as per Regulation 2019)

PR 5072 PRODUCTION OF AUTOMOTIVE COMPONENTS

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COURSE OBJECTIVES:

The objective of this course is

- To impart knowledge in various manufacturing methods in developing automotive components
- To study the concepts of automobile engineering.
- To impart the knowledge in various parts of automotive engine.
- To understand the concepts of fuel and transmission system.
- To learn the recent developments in automobile industries.

UNIT I ENGINE

9

Working principle of two strokes, four stroke and wankel engines – wet and dry liners – Piston and Piston rings – types – classification. Production of Cylinder block, Cylinder head, liners, oil pan, piston and piston rings and testing.

UNIT II ENGINE PARTS

9

Working principle of crank shaft – Cam shaft – valve operating mechanisms – carburetors – spark plug Production of Connecting rod, Crankshaft, push rod and rocker arm, valves, tappets, carburetors and spark plugs.

UNIT III FUEL AND TRANSMISSION SYSTEM

9

Working principle of – Fuel pumps – fuel injection pumps of diesel engines – multi point fuel injection system – Gear Box – clutch system – differential mechanism – steering system – braking system. Production of Friction lining materials for clutch and brakes, propeller shaft, gear box housing, steering column, Energy absorbing steering column.

UNIT IV CHASSIS AND SUSPENSION SYSTEM**9**

Working principle of – Suspension system – leaf spring and shock absorbers – wheel housing – design concepts of chassis (aerodynamics and cross worthiness) - Production of Brake shoes, leaf spring, wheel disc, wheel rim –usage of non metallic materials for chassis components.

UNIT V RECENT ADVANCES**9**

Application of sensors and actuators – Emission control system – catalytic converter – Hydro forming of exhaust manifold and lamp housing – stretch forming of Auto body panels – MMC liners – thermal barrier coating of Engine head and valves – Selection of materials for Auto components.

TOTAL : 45 PERIODS**COURSE OUTCOMES:**

At the end of the course, the students are expected to

CO1: Acquire knowledge of production of various automotive components.

CO2: Learn the working principles of engines.

CO3: Get knowledge about various engine components.

CO4: Learn working of Fuel and Transmission System and its types.

CO5: Acquire knowledge of recent development in automobile industries.

TEXT BOOKS:

1. Mohamed A.Omar, "The Automotive Body Manufacturing System and Processes", John Wiley Publications,USA, 2011.
2. Hiroshi yamagata, "The Science and Technology of materials in Automotive Engines", CRC Press Wordhead publishing Limited ,Cambridge, England, 2005.

REFERENCES:

1. Kirpal Singh, "Automobile Engineering.,Vol.I and II", Standard Publishers, New Delhi,13th edition, 2012.2. B.Strong, "Fundamentals of composite manufacturing", SME, 1989 S.C.Sharma, "Composite materials", Narosa publications, 2000.
2. Garrett. T.K., Newton. K., Steeds. W., "The Motor Vehicle", Butterworth-Heinemann, 13th edition, 2001
3. SeropeKalpakjian and Steven R. Schmid, "Manufacturing Processes for Engineering Materials", Fourth Edition – Pearson Education publications, 2003.
4. Brian Cantor, "Automotive Engineering", CRC Press ,Taylor and Francis Group, London,2008.

COURSE ALIGNED PROGRAMME OUTCOMES (PO) & PROGRAMME SPECIFIC OUTCOMES (PSO)

PO	Graduate Attribute	Programme Outcome
1	Engineering knowledge	Apply knowledge of mathematics, basic science and engineering science.
2	Problem analysis	Identify, formulate and solve engineering problems.
3	Design/development of solutions	Design a system or process to improve its performance, satisfying its constraints.
4	Conduct investigations of complex problems	Conduct experiments & collect, analyze and interpret the data.
5	Modern tool usage	Apply various tools and techniques to improve the efficiency of the system.
6	The Engineer and society	Conduct selves to uphold the professional and social obligations.
7	Environment and sustainability	Design the system with environment consciousness and sustainable development.

8	Ethics	Interacting industry, business and society in a professional and ethical manner.
9	Individual and team work	Function in a multidisciplinary team.
10	Communication	Proficiency in oral and written Communication.
11	Project management and finance	Implement cost effective and improved system.
12	Life-long learning	Continue professional development and learning as a life-long activity.

PSO	Graduates demonstrate
1	Knowledge on Production system: Familiarization of basic and advanced systems and practices.
2	Knowledge on design, analysis and development: Familiarization of system for Production processes, automation and quality systems.
3	Foundation of continuous improvement: Knowledge on application of appropriated materials, production processes and production system and development of an optimal solution to achieve continuous improvement to cater the needs of industry and society.

COURSE TENTATIVE SCHEDULE / PLAN

Week	Day	Date	Hrs	Unit	Topics	Mode of Lecture	Text / Ref.
1	Tue	23.01.2024	8	1	Introduction to engine	Chalk and Talk, PPT, Videos	T1
	Thu	30.01.2024	1,2	1	Working principle of two strokes, four stroke and wankel engines		T2
2	Tue	06.02.2024	8	1	wet and dry liners – Piston and Piston rings – types – classification		T1
	Thu	08.02.2024	1,2	1	Production of Cylinder block, Cylinder head		T1
3	Tue	13.02.2024	8	1	Production of Cylinder block liners, oil pan, piston		T1
	Thu	15.02.2024	1,2	1	Production of piston rings and testing.		T1
4	Tue	20.02.2024	8	2	Introduction to engine parts	Chalk and Talk, PPT, Videos	T1
	Thu	22.02.2024	1,2	2	Working principle of crank shaft – Cam shaft		T1
5	Tue	27.02.2024	8	2	Working principle valve operating mechanisms		T1
	Thu	29.02.2024	1,2	2	Production of carburetors – spark plug		T1
6	Tue	05.03.2024	8	2	Production of Connecting rod, Crankshaft, push rod and rocker arm		T1
	Thu	07.03.2024	1,2	2	Production of valves, tappets, carburetors and spark plugs.		T1
7	Tue	12.03.2024	8	3	Introduction to fuel and transmission system	Chalk and Talk, PPT, Videos	T1
	Thu	14.03.2024	1,2	3	Working principle of – Fuel pumps – fuel injection pumps of diesel engines		T1
8	Tue	19.03.2024	8	3	multi point fuel injection system – Gear Box		T1
	Thu	21.03.2024	1,2	3	clutch system – differential mechanism – steering system – braking system		T1
9	Tue	26.03.2024	8	3	Production of Friction lining materials for clutch and brakes,		T1

	Thu	28.03.2024	1,2	3	Production of propeller shaft, gear box housing, steering column, Energy absorbing steering column.		T1
10	Tue	02.04.2024	8	4	Introduction to chassis and suspension system	Chalk and Talk, PPT, Videos	T2,T1
	Thu	04.04.2024	1,2	4	Working principle of – Suspension system – leaf spring and shock absorbers		T1
11	Tue	09.04.2024	8	4	Wheel housing – design concepts of chassis (aerodynamics and cross worthiness)		T1
	Thu	11.04.2024	1,2	4	Production of Brake shoes, leaf spring,		T1
12	Tue	16.04.2024	8	4	Production of wheel disc, wheel rim		T1
	Thu	18.04.2024	1,2	4	usage of non metallic materials for chassis components.		T1
13	Tue	23.04.2024	8	5	Introduction to recent advances	Chalk and Talk, PPT, Videos	T1
	Thu	25.04.2024	1,2	5	Application of sensors and actuators		T1
14	Tue	30.04.2024	8	5	Emission control system – catalytic converter		T1
	Thu	02.05.2024	1,2	5	Hydro forming of exhaust manifold and lamp housing – stretch forming of Auto body panels		T1
15	Tue	07.05.2024	8	5	MMC liners – thermal barrier coating of Engine head and valves		T1
	Thu	09.05.2024	1,2	5	Selection of materials for Auto components.		T1

COURSE DELIVERY/INSTRUCTIONAL METHODOLOGIES:

<input checked="" type="checkbox"/> Chalk & Talk	<input checked="" type="checkbox"/> Stud. Assignments	<input checked="" type="checkbox"/> Web Resources
<input checked="" type="checkbox"/> LCD/Smartboards	<input checked="" type="checkbox"/> Stud. Seminars	<input type="checkbox"/> Add-On Courses

COURSE ASSESSMENT METHODOLOGIES-DIRECT

<input checked="" type="checkbox"/> University (End Semester) Examination	<input checked="" type="checkbox"/> Internal Assessment Tests		
<input checked="" type="checkbox"/> Assignments	<input type="checkbox"/> Laboratory Practices	<input type="checkbox"/> Mini/Major Projects	<input checked="" type="checkbox"/> Stud. Seminars
<input type="checkbox"/> Viva Voce	<input type="checkbox"/> Certifications	<input type="checkbox"/> Add-On Courses	<input type="checkbox"/> Others

COURSE ASSESSMENT METHODS

S.N.	Mode of Assessment	Date	Duration	% Weight
1	Internal Assessment Tests1		1½ hr	25 %
2	Internal Assessment Tests2		1½ hr	25 %
3.	University Examination		3 hr	50 %
Additional marks may be given for Assignments / Group/ Team SeminarPresentation)				

COURSE ASSESSMENT METHODOLOGIES-INDIRECT

<input checked="" type="checkbox"/> Assessment of CO (By Feedback, Once)	<input checked="" type="checkbox"/> Student Feedback On Faculty (Once)
<input type="checkbox"/> Assessment of Mini/Major projects by Ext. Experts	<input type="checkbox"/> Others

COURSE (EXTRA) ESSENTIAL READINGS:

1. NPTEL LINK: (web link to be pasted)

COURSE EXIT SURVEY (will be collected at end of the course)

The purpose of this survey is to find out from students about their learning experiences and their thoughts about the course.

COURSE OUTCOMES	STUDENTS RATING Low (1) /Medium(2)/High(3)
CO1:	
CO2:	
CO3:	
CO4:	
CO5:	

PROGRAMME OUTCOMES	STUDENTS RATING Low (1) /Medium(2)/High(3)
PO1	
PO2	
PO3	
PO4	
PO5	
PO6	
PO7	
PO8	
PO9	
PO10	
PO11	
PO12	
Average	

PROGRAMME SPECIFIC OUTCOMES	STUDENTS RATING Low (1) /Medium(2)/High(3)
PSO1	
PSO2	
PSO3	

COURSE POLICY (Compensation Assessment)

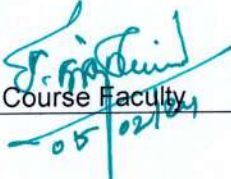
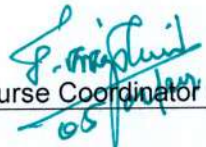
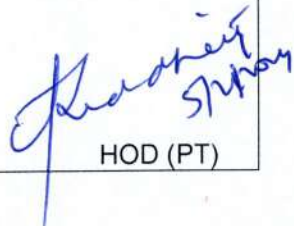
1. Attending all the assessment is mandatory for every student
2. Course policy will be followed as per the academic course regulation

COURSE ACADEMIC DISHONESTY AND PLAGIARISM

1. All rules and regulation prescribed by the ACOE, University Departments, are applicable in the Internal Assessment Tests and University (End Semester) Examinations. (https://acoe.annauniv.edu/download_forms/student_forms/Guidelines.pdf)
2. In general, possessing a mobile phone, carrying bits of paper with materials, talking to other students, copying from other students during Internal Assessment Tests and University (End Semester) Examinations will be treated as Malpractice and punishable as per the rules and regulations. The misuse of Assignment / Project / Seminar works from others is considered as academic dishonesty and will be treated with the rules and regulations of the University.

COURSE ADDITIONAL INFORMATION

Queries / clarifications / discussion (if required) may be e-mailed to / contact the course instructors during their Office Hours.

For Approval		
 Course Faculty	 Course Coordinator (if any)	 HOD (PT)