
		Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441108 NAAC Accredited with A+ Grade (An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)			
Second Year (Semester-III) B.Tech. Mechanical Engineering					
BME32325: Advanced Manufacturing Technologies					
Teaching Scheme			Examination Scheme		
Lectures	3Hr/Week		CT	30	
Tutorials	-		CA	10	
Total Credits	3		ESE	60	
			Total	100 Marks	
			Duration of ESE: 03 Hrs		
Course Objectives:					
1	To emphasize the importance advanced manufacturing sciences in the day-to-day life.				
2	To study the basic advanced manufacturing processes and tools used.				
3	To understand the advanced manufacturing processes like machining processes, casting, welding process & metal forming, grinding.				
Course Contents				Hours	
Unit I	Advanced Machining Processes- Introduction, Process principle, Material removal mechanism, Applications of processes such as: ultrasonic machining (USM), Abrasive jet machining (AJM), Water jet machining (WJM), Abrasive water jet machining (AWJM), Electrochemical machining (ECM), Electro discharge machining (EDM),				(7)
Unit II	Advanced Casting Processes: - Metal mould casting, Continuous casting, squeeze casting, Vacuum mould casting, Evaporative pattern casting, Ceramic shell casting				(7)
Unit III	Advanced Welding Processes: - Details of electron beam welding (EBW), Laser beam welding (LBW), Ultrasonic welding (USW)				(7)
Unit IV	Advanced Metal Forming Processes:- Details of high energy rate forming (HERF), process Electro-magnetic forming, explosive forming Electro-hydraulic forming, Stretch forming, Contour roll forming				(7)
Unit V	Advanced grinding technologies: High speed and high performance grinding. Hard machining using single point tools.				(7)


Text Books	
T.1	A Text of Book Manufacturing Technology by Chand And Co. Publication.
T.2	A Text of Book Manufacturing Technology II by Chand And Co. Publication.
Reference Books	
R.1	Advanced Manufacturing Processes by Yashvir Singh, Nishant K. Singh, Mangey Ram. Publisher: CRC Press, Boca Raton
R.2	Advanced Manufacturing Technologies by Kapil Gupta. Publisher: Springer International Publishing, Cham.
R.3	Advanced Manufacturing Techniques for Engineering and Engineered Materials by R. Thanigaivelan, N. Rajan, T.G. Argul.

Useful Links	
1	https://nptel.ac.in/courses/112104195
2	https://nptel.ac.in/courses/112104204

	Course Outcomes	CL
BME32325.1	Apply the advanced machining processes for the components manufacturing.	3
BME32325.2	Prepare casting by using advanced processes casting.	3
BME32325.3	Summarize appropriate welding process based on the advanced welding processes type of industrial application.	2
BME32325.4	Describe various advanced metal forming processes.	2
BME32325.5	Understand various advanced grinding technologies.	2



Mechanical Engineering (MCA Accredited)
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Second Year(Semester-III) B.Tech. Mechanical Engineering

BME32321:Introduction to Automobile Engineering

Teaching Scheme		Examination Scheme	
Lectures	3Hr/Week	CT	30
Tutorials	-	CA	10
Total Credits	3	ESE	60
		Total	100 Marks
		Duration of ESE: 03 Hrs	

Course Objectives:

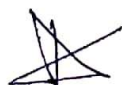
1	To understand vehicle layout fundamentals, their classification, history and, evolution.
2	To understand SI vs CI Engines, its components and applications, working principle.
3	To understand vehicle systems & subsystems and its importance.
4	To understand automotive electrical & electronics.

Course Contents		Hours
Unit I	Vehicle Layout Fundamentals:- Introduction to Automobiles: Classification, History, Evolution, Vehicle Layouts: Front-engine, Rear-engine, Chassis & Frame: Types, Body Construction, Crumple Zones.	(7)
Unit II	Internal Combustion Engines: SI vs CI Engines, Engine Components & Working, Engine Parameters: Bore, Stroke, Compression Ratio, Power Transmission Systems, Clutch, Gearbox, Propeller Shaft, Differential, Axles	(7)
Unit III	Vehicle Systems & Subsystems: - Introduction of: - Suspension Systems: Types, Steering Systems, Braking Systems, Tires and Wheels, Cooling & Lubrication Systems	(7)
Unit IV	Automotive Electrical & Electronics:- Battery & Charging System (Alternator, Regulator), Starter Motor.	(7)
Unit V	Automotive Electronics:- Ignition Systems (Magneto, Electronic), Sensors & Actuators in Modern Vehicles (O ₂ sensor, MAF, Crankshaft Sensor), Electronic Fuel Injection (EFI), MPFI, CRDi systems.	(7)

Text Books	
T.1	Automobile Engineering (Vol. I & II) by Kirpal Singh, Publisher: Standard Publishers. Distributors
T.2	Automotive Mechanics by William H. Crouse, Donald L. Anglin, McGraw-Hill Education.
T.3	A Textbook of Automobile Engineering by R. K. Rajput, Publisher: Laxmi Publications.
T.4	Automobile Engineering by Dr. P.S. Gill, Publisher: S.K. Kataria & Sons
Reference Books	
R.1	The Automotive Chassis: Engineering Principles by Giancarlo Genta, Lorenzo Morello, Publisher: Springer
R.2	Internal Combustion Engine Fundamentals by John B. Heywood, Publisher: McGraw-Hill Education
R.3	Vehicle Dynamics: Theory and Application by Reza N. Jazar, Publisher: Springer

Useful Links	
1	http://digimat.in/nptel/courses/video/107106088/L01.html
2	https://ed.iitm.ac.in/~shankarram/Course_Files/ED5160/ED5160.htm

	CourseOutcomes	CL
BME32321.1	Recognize vehicle fundamentals of layout.	2
BME32321.2	Describe internal combustion engines.	2
BME32321.3	Apply vehicle systems & subsystems in the automobile.	3
BME32321.4	Interpret automotive electrical devices.	3
BME32321.5	Understand automotive electronics devices.	2



HOD

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