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	
Lectures	3Hr/Week
Tutorials	-
Total Credits	3

Examination Scheme	
CT	30
CA	10
ESE	60
Total	100 Marks
DurationofESE:03Hrs	

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 marching (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 TechnolgyII 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 byKapil 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

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and Technology, Nagpur

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Engineering

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

BME32321:Introduction to Automobile Engineering

Teaching Scheme	
Lectures	3Hr/Week
Tutorials	-
Total Credits	3

Examination Scheme	
CT	30
CA	10
ESE	60
Total	100 Marks
DurationofESE:03Hrs	

Course Objectives:

1	To understand vehicle layout fundamentals, their classification, history and, evolution.
2	To understand SI vs CI Engines, it components and applications, working principle.
3	To understand vehicle systems & subsystems and it 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 (O2 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

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