SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

Mechanical Engineering Department

Semester/Year		VI/III	Program		B.Tech.
Subject Category	DC	Subject Code:	MEC361	Subject Name:	Manufacturing Process

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
60	20	20	10	30	10	10	150	3	-	2	4

Prerequisites:(Only for open electives)

Course Objective:

- Learn the fundamentals of lathe machine, their types and various operations which are performed on lathe
- Understanding of shaping and planning process, used machine and their application
- To understand the basic concepts of drilling, reaming and boarding and allied machines
- Learning of process of milling, grinding and finishing operations and their applications.

Course Outcomes:

After completion of the course, students would be able to -

1. Learn the various parts of the machine used in the manufacturing process
2. Understand the basic operations of the machines involved in metal cutting
3. Classifications of machines and machining operations
4. Determine the appropriate manufacturing process(es) for the product to be made
5. Measure the material removal rate and the power required in various metal cutting operations.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2			1							
CO2	3	2										
CO3	3	1										
CO4	3	2	2									
CO5	3	2			1							

Contents:			
UNITs	Descriptions	Hrs.	CO's
I	***Lathe Machine and operations*** Definition, working principle, Parts of the lathe, Lathe Accessories (work and tool holding devices), specifications of lathe, various types of lathe (Engine, Turret and Capstan lathe) , Automatic lathes, Operating conditions, Material Removal Rate, Lathe operations (Turning, Facing, Boring, Drilling, Reaming, Threading, Knurling, Grooving, Parting, Chamfering), Methods of taper turning, Thread cutting attachment.	8	CO1
II	***Shaper & Planer Machine*** Construction of shaper, working principle, Specifications and types of shaper machine, Quick return mechanism, work holding devices for shaping, Special operations performed by shaper, Machining time and material removal rate. Construction of planer, Types of planning machine, specifications, work holding devices for planning, Operations performed by planner (planning of horizontal, angled, vertical and curved surfaces).	8	CO2
III	**Drilling Machine** Drilling operations, Nomenclature of twist drill, Drill angles, Types of drilling machine, Cutting force and power required in drilling, Reaming operation, Types of reamer, Boring operations, Boring Machines types, Tapping, various type of taps.	8	CO3
IV	**Milling and broaching Process** Types of milling machine, Milling cutters, Arbors, Up and Down milling, Types of milling operations (straddle milling, form milling, gang milling, slotting, slitting), Indexing, Removal Rate. Types of work done on broaching machine. Simpletypes of broaches and their uses, Types of broaching machines	8	CO4
V	**Grinding and Finishing** Types of grinding machine (horizontal and vertical), centered and centerless grinding, electrochemical grinding, Grinding wheels and designation, dressing of grinding wheel. Honing and superfinishing, lapping, polishing, nano-polishing, deburring, Abrasive flow machining. Economics of grinding and finishing operations.	8	CO5
Guest Lectures (if any)			
Total Hours: 40			
Suggestive list of experiments: (if any)			

Text Books-

1. SeropeKalpakjian and Steven R. Schmid – ‘’Manufacturing Engineering and Technology’ – Prentice Hall – 2013 – 7th Edition
2. PC Sharma “Production Technology” Publisher S Chand
3. Hazra&Choudhary, “Workshop Tevhnology Vol. II” Tata Mc Graw Hill

Reference Books-

1. H.N. Gupta, “Manufacturing Processes, New Age International Publisher
2. E. P. DeGarmo, J. T. Black, and R. A. Kohser, “DeGarmo's materials and processesin manufacturing,” John Wiley & Sons, 2011.
3. S. Kalpakjian, and S. R. Schmid, “Manufacturing processes for engineering materials,” 5 th Ed. Pearson education, India, 2010

Modes of Evaluation and Rubric

There will be continuous evaluation for during the semester for 40 sessional marks and 60 semester End term Marks. Out of 40 sessional marks, 20 shall be awarded for Mid semester, 20 marks to be awarded for day to day performance and Quiz/Assignments. For the 60 Marks, there will be a semester – End examination as per the norms of AICTE.

Recommendation by Board of studies on	Date:
Approval by Academic council on	Date:
Compiled and designed by	Name 1. Dr. Pradeep Singh Name 2:-
Checked and approved by	Name 1.**Prof. Sanjay Jain**

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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Mechanical Engineering Department

Semester/Year		VI/III	Program		B.Tech.
Subject Category	**DC**	Subject Code:	**ME-362**	Subject Name:	**Automotive Technology**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:(Only for open electives)

Course Objective:

This course, designed to equip students with the knowledge, skills, and ethical mindset to design, analyse, maintain, and innovate, will prepare them to thrive in the rapidly changing automotive industry.

Course Outcomes:

After completion of the course, students would be able to -

1. Understand the basic layout of Automobiles, Chassis and frames.
2. Understand the Operation of transmission Suspension, Steering and Breaking system.
3. Understand the role of electronics and control systems, focusing on the most recent developments in automotive technology.
4. Understand the different types of batteries and analyse their performance parameters.
5. Understand the battery charging requirements and develop the complete battery model.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3		2			1	1	1				
CO2	3	3	2	1			l					
CO3	3	3	2	1	1	1		1			1	
CO4	3	2	1	1	1	1	l					
CO5	1	1			3		2	1		1		1

Contents:			
UNITs	Descriptions	Hrs.	CO's
I	**Chassis & Body Engg:** Types, Technical details of commercial vehicles, types of Chassis, layout, types of frames, testing of frames for bending & torsion on unutilised body frame, vehicle body and their construction, driver's visibility and methods for improvement, safety aspects of vehicles, vehicle aerodynamics, front wheel and rear wheel drive, four-wheel drive.	8	1
II	**Steering System:** front axle beam, stub axle, front wheel assembly, principles of types of wheel alignment, front wheel geometry viz. camber, Kingpin inclination, castor, toe-in and toe-out, condition for true rolling motion, centre point steering, directional stability of vehicles, power steering, slip angle, cornering power, oversteer & understeer. **Transmission System:** Function and types of clutches, clutch lining and bonding, double-declutching, types of gear Boxes, synchronised, gear materials, determination of gear ratio for vehicles, automatic transmission, torque converters, fluid coupling, principle of hydrostatic drive, propeller shaft, differential gearbox, rear axle construction.	8	2
III	**Suspension system:** Basic suspension movements, Independent front & rear suspension, shock absorber, type of springs, location of shackles, power calculations, resistance to vehicle motion during acceleration and braking, power & torque curve, torque & mechanical efficiency at different vehicle speeds. **Brakes**: Principle of braking system, braking mechanism, mechanical and hydraulic brakes, power brakes, vacuum and air brakes. **Wheels and Tyres:** Wheel drum, tyre, materials and manufacturing of tyers, troubleshooting and maintenance.	8	3
IV	**Electrical and Control Systems:** construction and operation of lead acid battery, principle of operation of starting mechanism, different drive systems, starter relay switch, regulator electric fuel gauge, horn, wiper, Lighting system, headlight dazzling, exhaust gas recirculation, electronic control unit (ECU), turbocharging, Multi valve engines. **Electric Vehicles:** introduction & history; working concepts; main components of electric vehicles; infrastructures of electric vehicles;	8	4

	Challenges and future trends.		
V	**Types of Batteries:** Lead Acid Batteries, Nickel-based Batteries: Introduction, Nickel-cadmium, Nickel metal hydride batteries, Sodium-based Batteries, Lithium Batteries, Metal-Air Batteries, **Battery Charging and Modelling:** Battery Charging, Battery chargers, Charge equalisation, The Designer's Choice of Battery, Use of Batteries in Hybrid Vehicles, Internal combustion/battery electric hybrids, Battery/battery electric hybrids, Combinations using flywheels, Complex hybrids, Battery Modelling, the purpose of battery modelling, Battery equivalent circuit, Modelling battery capacity, Simulation a battery at a set power, Calculating the Peukert Coefficient, Approximate battery sizing	8	5
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. To study and prepare a report on the construction details, working principles, and operation of an automotive vehicle.
2. To study and prepare a report on the construction details and working principles of the operation of the Automotive Engine and Sub Systems.
3. To study and prepare a report on the construction details and working principles of the automotive transmission systems.
4. To study and prepare a report on the constructional details, working principles, and operation of the automotive drive lines and differentials.
5. To study and prepare reports on the constructional details of working principles of the operation of the Automotive Steering Systems.
6. To study and prepare a report on the construction details, working principles, and operation of the Automotive Suspension Systems.
7. To study and prepare a report on the construction details, working principles, and operation of the Automotive Brake systems.
8. To study and prepare a report on the construction details, working principles, and operation of Electric vehicle
9. To study and prepare a report on the construction details of battery technology in electric vehicles.
10. To study and prepare a report on battery thermal management and a complete model investigation.

Text Books-

1. Automobile Engg. TR Banga&Nathu Singh.
2. Barak (Ed.), T. Dickinson, U. Falk, J.L. Sudworth, H.R. Thirsk, F.L. Tye, "Electrochemical Power Sources: Primary & Secondary Batteries", IEE Energy Series 1, A. Wheaton & Co, Exeter, 1980.
3. Joseph Heitner, Automotive Mechanics, Principles and Practices, CBS Pub.

Reference Books-

1. Srinivasan S; Automotive engines; TMH.
2. Automobile Engg. GBS Narang.
3. Kripal Singh, Automotive Engineering Khanna Pub.
4. Newton & Steeds, Automotive Engineering.
5. James Larminie Oxford Brookes University, Oxford, UK John Lowry Acenti Designs Ltd., UK, Electric Vehicle Technology Explained
6. MehrdadEhsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004.

Modes of Evaluation and Rubric

There will be continuous evaluation for during the semester for 30 sessional marks and 60 semester End-term Marks. The practical marks are 50, out of which 30 marks will be awarded for viva voce and 20 marks for lab work. Out of 40 sessional marks, 20 shall be awarded for Mid-semester, 20 marks to be awarded for day-to-day performance and Quizzes/Assignments. For the 60 Marks, there will be a semester – End examination as per the norms of AICTE.

Recommendation by the Board of Studies on	Date:
Approval by the Academic Council on	Date:
Compiled and designed by	Name 1. Dr. Gopal Kumar Deshmukh
Checked and approved by	Name **1. Dr. Ashish Manoria**

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Mechanical Engineering Department

Semester/Year		VI/III	Program		B.Tech.
Subject Category	**DLC**	Subject Code:	**MEL 366**	Subject Name:	**LAB-III**

Maximum Marks Allotted							Contact Hours			Total Credits
Theory			Practical			Total Marks				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
-	-	-	30	20	10	50		1	2	2

Prerequisites:(Only for open electives)

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Course Objective:

The main learning objective of this course is all about learning and completing the exposure required for effective usage of the Ansys Workbench Software.

Course Outcomes:

After completion of the course, students would be able to perform-

1. Meshing of geometriesanalysis
2. Static Structural analysis
3. Modal analysis
4. Thermal, Thermo-structural analysis
5. buckling analysis
6. experiments on dynamics

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	1	3				2			3
CO2	3	3	3	1	3				2			2
CO3	3	3	3	1	3				2			2
CO4	3	3	3	1	3				2			2
CO5	3	3	3	1	3				2			2

Contents:

UNITs	Descriptions	Hrs.	CO's
	Hands on exposure will be provided on some of the elective subjects that are included in V and VI semester under departmental	30	

	category. Objective of this is to provide introductory exposure to subjects which could not be included as regular subjects. Practical sessions includes industrial and academic examples for learning how to apply Ansys Workbench software for efficiently performing different kinds of Simulations, HyperMesh		
Guest Lectures (if any)			
Total Hours			

Suggestive list of experiments: (if any)

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Text Books-

1.

Reference Books-

1.

Modes of Evaluation and Rubric

There will be continuous evaluation for during the semester for 40 sessional marks and 60 semester End term Marks. The practical marks are 50, out of which 30 marks will be awarded for viva voce and 20 marks for lab work. Out of 40 sessional marks, 20 shall be awarded for Mid semester, 20 marks to be awarded for day to day performance and Quiz/Assignments. For the 60 Marks, there will be a semester – End examination as per the norms of AICTE.

Recommendation by Board of studies on	Date:
Approval by Academic council on	Date:
Compiled and designed by	Name 1.Dr. Chandra Pal Singh Name 2:
Checked and approved by	Name 1.**Prof. Sandeep Jain**

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Mechanical Engineering Department

Semester/Year		VI/III	Program		B.Tech.
Subject Category	**DLC**	Subject Code:	**MEL-367**	Subject Name:	**Internship II & Seminar**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
				30	20		50	0	0	4	2

Prerequisites:(Only for open electives)

Course Objective:

The course objectives are designed to seamlessly align with the educational goals of the program, offering learners a structured framework for experiential learning. By integrating theoretical knowledge with practical application, these objectives aim to equip students with hands-on experience, enhance their professional skills, and provide insights into industry practices. The structured framework ensures that students engage meaningfully in their internship, fostering a dynamic learning environment that contributes to their overall academic and professional development.

Course Outcomes:

After completion of the course, students would be able to –

1. **CO1**:Demonstrate the application of engineering principles and technical skills in a real-world setting.
2. **CO2**:Exhibit professional conduct and ethical behaviour in engineering practice.
3. **CO3**:Plan, execute, and complete engineering projects within specified timelines.
4. **CO4**:Communicate technical information and collaborate within a multidisciplinary team.
5. **CO5**:Apply critical thinking skills to analyze and solve engineering problems.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		3		3								3
CO2								3				
CO3											3	3
CO4									3	3	3	
CO5		3		3								3

Contents:

UNITs	Descriptions	Hrs.	CO's
I	**Applied Engineering Knowledge and Skills**	4	1
II	**Professional and Ethical Behavior**	4	2
III	**Project Management and Execution**	4	3
IV	**Communication and Teamwork**	4	4
V	**Critical Thinking and Problem-Solving**	4	5
Guest Lectures (if any)			
Total Hours		20	

Modes of Evaluation and Rubric

Performance Indicator	Poor (50% OF A/B/C/D/E)	Fair (60% A/B/C/D/E)	Good (80% A/B/C/D/E)	Excellent (100% A/B/C/D/E)	PO's
[A] Timeline scheduled. [MARKS= 10% OF MAXIMUM MARKS]	Not scheduled and not followed	Not scheduled and not followed	Scheduled but not followed strictly	Scheduled and followed strictly	PO8, PO11
[B] Usage of the latest application and software [MARKS= 10% OF MAXIMUM MARKS]	No latest applications and software's used	Slightly Outdated	Moderate Usage of new technology	latest applications and software are used	PO5
[C] Proper documentation work	Poor Documentation	Average documentation	Good Documentation	Excellent Documentation	PO10

[MARKS= 20% OF MAXIMUM MARKS]					
[D] Presenting skills, Fluency, and Vocabulary [MARKS= 30% OF MAXIMUM MARKS]	Poor Skills	Less confidence, vocabulary needs to be improved	Good confidence, but lack of communication skills	Good confidence, but lack of communication skills	PO10
[E] Slide Organization and Contents time conscious [MARKS= 30% OF MAXIMUM MARKS]	Poor Organization and least time management	Content is not organized properly	Content is organized properly but no effective time management	Content is organized properly and effective time management	PO10

There will be continuous evaluation during the semester for 50 practical marks.

The practical marks are 50, out of which 30 marks will be awarded for Power Point Presentation and 20 marks for lab work.

20 marks for lab work to be awarded for day-to-day performance.

Recommendation by Board of studies on	Date:
Approval by Academic council on	Date:
Compiled and designed by	Name 1.Dr. Ravindra Mohan
Checked and approved by	Name 1.**Dr. Ashish Manoria**