(Engineering College), VIDISHA M.P. (An Autonomous Institute Affiliated to RGPV Bhopal) Mechanical Engineering Department Subject VIII Program BEnd. Subject Code: MucCode Subject Name: Contect Hours Subject Code: MucCode Subject Name: Contect Hours Total Contect Hours Mid-Sem Quiz Assignment Fnd Lab- Work Quiz L Total Contect Hours Mid-Sem Quiz Assignment Fnd Lab- Work Quiz L Total Contect Hours Mid-Sem Quiz Assignment Fnd Lab- Work Quiz L Total Contect Hours Contect Hours Contect Hours Total Contect Hours Preerwerwerwerwerwerwerwerwerwerwerwerwer	STANK TECHNOL	GIGI ADINI			SAMRAT	' ASHO	K TEC	HNOL	OGICA	L INS	STITUT	ГΕ	
An Autonomous Institute Affiliated to RGPV Bhopal J Mechanical Engineering Department B.Tech. Samester:Year B.Tech. Subject Subject Marce B.Tech. Subject Code: Marce Total Centat Hours 60 20 20 10 30 10 10 Total Centat Hours Freequisites:(Only for open electives) End Lab Quiz I Total Centat Hours Contat Hours Contat Hours Total Centat Hours Outer standing of assign and planning process, used machine and their applications. Contex Hours Outer standing of basing and planning process, used machine and their applications. Contex Hours	St. Conte				(E	ngineer	ing Col	llege), V	IDISH	[A M.]	P.		
Mechanical Engineering DepartmentSemester/YearB.Tech.Subject Code:MIEC361Subject Nam:B.Tech.Subject Code:MIEC361Subject Nam:B.Tech.Total MarksTotal MarksTotal CreditsTotal Contact HoursTotal MarksTotal CreditsTotal MarksContact HoursTotal CreditsTotal MarksContact HoursTotal CreditsTotal MarksContact HoursTotal CreditsTotal MarksContact HoursTotal 	VIDISHA	AR			(An A	Autonomo	us Institu	te Affiliat	ed to RG	PV Bho	opal)		
Semeser/VearVI/IIIProgramB.Tech.Subject CategoryNote: SubjectMEC361Subject Name:Umandacturing ProcessMathewTotal Contact HarmonTotal CredisTheoryPrecicalTotal Contact HarmonTotal CredisEnd SemMid-SemQuizAssignment SemTotal WorkQuizAssignment SemTotal Contact HarmonTheoryTotal SemTotal WorkQuizAssignment SemTotal Contact HarmonTheoryQuizAssignment SemTotal Contact HarmonTheoryQuizAssignment SemTotal Contact HarmonOuter Stand the SemAssignment SemTotal Contact HarmonOuter Stand the basic concepts of drilling, reaming and boarding and allied machines ing or process of milling, reaming and boarding and allied machines individuel HarmonOuter Stand the basic concepts of drilling, reaming and boarding and lice Harmon process of milling operationsAddet SemOuter Stand the basic concepts of drilling, reaming and boarding and lice Harmon process of milling operationAddet Sem <th< td=""><td>the saily she</td><td></td><td></td><td></td><td>Me</td><td>chanica</td><td>al Eng</td><td>ineerin</td><td>ig Dep</td><td>artm</td><td>ent</td><td></td><td></td></th<>	the saily she				Me	chanica	al Eng	ineerin	ig Dep	artm	ent		
Subject CategoryDCSubject CodeMEC361Subject Name:Manufacturing Process $VarterCategoryTotalMarksContact HorMarksTotalCreditsContact HorCreditsTotalCreditsEnd SemMid-SemQuizAssignmentEndSemLab-WorkQuizLTP60202010301010103-24PrecialMarksPrecialWorkQuizLTP24PrecialMarksPrecialMarksPrecialMarksLab-WorkQuizLTP24PrecialMarksPrecialMarksPrecialMarksLab-WorkQuizLTP24PrecialMarksPrecialMarksPrecialMarksLab-WorkQuizLTP24PrecialMarksPrecialMarksLab-WorkQuizLTP24PrecialMarksPrecialMarksLab-MarksLTPPPrecialMarksPrecialMarksPrecialPrecialPrecialPrecialPrecialLTLTPPrecia$	Semester/	Year		VI/III		Progra	m				B.Tech.		
Theory Total Credits Output: Total Credits Theory Total Credits Total Credits Theory Total Credits	Subject Category	I	DC	Subject Code:	MEC	361	Subject	Name:		Manuf	facturing	Process	
TheoryPracticalTotal MarksCreditsEnd SemMid-SemQuizAssignmentEnd SemLab- WorkQuizLTPCredits602020103010101503-24Prerequisites:Course Objective:Course objective:Outlerstanding of shaping and planning process, used machine and their applications.Course objective:Course objective:Course objective:Course objective:Course objective:Course objective:Course objective:After completion of the course, students would be able to -Learn the various parts of the machine used in the manufacturing process(es) for the product to be madeCuderstand the basic operations o				Μ	laximum Marks	Allotted			T (1		C		Total
End SemMid-SemQuizAssignmentEnd SemLab- WorkQuizLTP602020103010101503-24PreferencePreferencePreferenceCourse Objective:Course Objective:Course Objective:Course Objective:Course Objective:Course of an and profession on latheUnderstand the fundamentals of lathe machine, their types and various operations which are performed on latheUnderstand the basic concepts of drilling, reaming and boarding and allied machinesLearn the fundamentals of the machine used in the manufacturing process. Learning of process of milling, grinding and finishing operations and their application.Course Outcomes:Course Outcomes:Course outcomes:Course outcomes:Outcomes: audents 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 cuttingAlter colspan="4">Outperformed on althe constitue and machining operations.Course Outcomes:Course Outcomes:Outperformed remover required in metal cuttingCourse outcomes:Outperformed remover required in the power required in various metal cutting <td< td=""><td></td><td></td><td>The</td><td>ory</td><td></td><td></td><td>Practical</td><td>l T</td><td>Marks</td><td>s</td><td>Contact H</td><td>ours</td><td>Credits</td></td<>			The	ory			Practical	l T	Marks	s	Contact H	ours	Credits
60 20 20 10 30 10 10 150 3 - 2 4 Prerequisites:(Only for open electives) Prerequisites:(Only for open electives) Course Objective: Course Objective: Course Objective: Understanding of shaping and planning process, used machine and their application To understand the basic concepts of drilling, reaming and boarding and allied machines Learn the various parts of the machine used in the manufacturing process 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 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. Question of the course, students would be able to - 1 Learn the various parts of the machines involved in metal cutting After completine the app	End Sem	Mie	d-Sem	Quiz	Assignment	End Sem	Lab- Work	Quiz		L	Т	Р	
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. Out 0 6 PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 Cot 3 2 1 1 1 1 1 1 1 1	60		20	20	10	30	10	10	150	3	-	2	4
Tricequation (or open clearities) 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. Cot 3 2 1 I <td>Prerequisi</td> <td>tes.(C</td> <td>)nly for</td> <td>onen alac</td> <td>rtives)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Prerequisi	tes.(C)nly for	onen alac	rtives)								
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: 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 propriate manufacturing process(es) for the product to be made 5. Measure the material removal rate and the propriate manufacturing process (es) for the product to be made 5. Measure the material removal rate and the propriate manufacturing process (es) for the product to be made 6 001 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO1 PO1 6 03 2 1 1 1 1 1 1 1 1	Therequisi	.us.(C	JIII Y 101	open cice									
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. Course Out PO2 PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 coa 3 2 1 1 1 1 1 1 1 1 1 1 1 1 1													
 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 - Learn the various parts of the machine used in the manufacturing process Understand the basic operations of the machines involved in metal cutting Classifications of machines and machining operations Determine the appropriate manufacturing process(es) for the product to be made 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 In In I	Course O	Course Objective:											
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. vol PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 co1 3 2 1	• I	• Learn the fundamentals of lathe machine, their types and various operations which are											
 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 - Learn the various parts of the machine used in the manufacturing process Understand the basic operations of the machines involved in metal cutting Classifications of machines and machining operations Determine the appropriate manufacturing process(es) for the product to be made 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 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	F	oerfo	rmed o	n lathe									
 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 - Learn the various parts of the machine used in the manufacturing process Understand the basic operations of the machines involved in metal cutting Classifications of machines and machining operations Determine the appropriate manufacturing process(es) for the product to be made 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 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	• (Jnde	rstandi	ng of sh	naping and p	lanning	process	, used m	achine a	and the	eir appli	cation	
 Learning of process of milling, grinding and finishing operations and their applications. Course Outcomes: After completion of the course, students would be able to - Learn the various parts of the machine used in the manufacturing process Understand the basic operations of the machines involved in metal cutting Classifications of machines and machining operations Determine the appropriate manufacturing process(es) for the product to be made 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 Co2 3 2 Co3 3 1 Co4 3 2 Co5 3 3 Co5 3 3 Co5 3 3 Co5 3 3 Co5 3 4 Co5 4	•]	lo ur	dersta	nd the b	asic concept	ts of dril	ling, rea	aming ar	id board	ling an	d allied	l machi	nes
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. Vol PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 Co1 3 2 1	• I	Learn	ing of	process	of milling,	grinding	and fin	ishing o	peration	ns and	their ap	plicatio	ns.
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. Cot 3 2 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 Cot 3 2 1	Course O	utcor	nes:										
 Learn the various parts of the machine used in the manufacturing process Understand the basic operations of the machines involved in metal cutting Classifications of machines and machining operations Determine the appropriate manufacturing process(es) for the product to be made 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 I I I I I I I I I I I I I I I I I I	After cor	nplet	ion of t	he cours	e, students w	ould be a	ble to -						
 Understand the basic operations of the machines involved in metal cutting Classifications of machines and machining operations Determine the appropriate manufacturing process(es) for the product to be made 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 CO1 3 2 CO2 3 2 CO3 3 1 CO3 3 1 CO4 3 2 CO5 1 CO5 1 CO5 1 CO5 2 C	1. I	Learn	the va	rious pa	arts of the m	achine u	sed in t	he manu	facturin	ng proc	ess		
 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 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2. U	Jnde	rstand	the basi	c operations	of the n	nachine	s involve	ed in me	etal cut	tting		
4. Determine the appropriate manufacturing process(es) for the product to be made5. Measure the material removal rate and the power required in various metal cutting operations.PO1PO2PO3PO4PO5PO6PO7PO8PO9PO10PO11PO12C013211111111C023211111111C033111111111C0432211111111C05321111111111	3. (Class	ificatio	ons of m	achines and	machini	ing oper	rations			_	_	
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 C01 3 2 1	4. I	Deter	mine t	he appro	opriate manu	ıfacturin	g proce	ss(es) fo	r the pr	oduct t	to be ma	ide	
PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 C01 3 2 1	5. N	vleas opera	ure th tions.	e matei	rial remova	l rate a	nd the	power	require	d in v	various	metal	cutting
CO1 3 2 1	I	PO1	PO2	PO3	PO4	PO	5 PO6	PO7	PO8	PO9	PO10	PO11	PO12
111 1111 1111 1111 1111 1111 1111 1111 11111 11111 111111 111111 1111111 11111111 $111111111111111111111111111111111111$	CO 1	3	2			1							
cold 3 1 Image: cold Image: cold <td>(0)</td> <td>3</td> <td>2</td> <td></td>	(0)	3	2										
CO3 3 2 2 CO4 3 2 2 CO5 3 2 1	<u> </u>	3	1										
CO4 3 2 2 1 1 1 CO5 3 2 1 <td>103</td> <td>2</td> <td>2</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	103	2	2	2									
CO5 3 2 1	CO4	3	Z	Z									
	CO 5 ³		2			1							

Annexure 3

Contents:											
UNITs	Descriptions	Hrs.	CO's								
Ι	<i>Lathe Machine and operations</i> 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								
Π	 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								
Ш	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 Lec	tures (if any)										
Total Ho	ars: 40										
Suggestiv											

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 processes in 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 (Engineering College), VIDISHA, M.P. (An Autonomous Institute Affiliated to RGPV Bhopal)

Mechanical Engineering Department

Ser	nester/Year	VI/III		Prog	gram			I	3.Tech.		
Subject Category	DC	Subject Code:	ME-3	52 S	ubject N	ame:	Automotive Technology				
Maximum Marks Allotted Contact Hours										Total	
Theory					Practical			Con	Credit		
End	Mid Som	Assignment		End	Lab-	Ouiz	Morke	т	т	D	
Sem	wiid-Sein	Assignment	Quiz	Sem	Work	Quiz	WIAIKS	L	1	1	
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			1					
CO3	3	3	2	1	1	1		1			1	
CO4	3	2	1	1	1	1	1					
CO5	1	1			3		2	1		1		1

Annexure 3

Contents:										
UNITs	Descriptions	Hrs.	CO's							
Ι	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							
П	 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.		
 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:		
 operation of an automotive vehicle. To study and prepare a report on the construction details and working properation of the Automotive Engine and Sub Systems. To study and prepare a report on the construction details and working properation of the Automotive Engine and Sub Systems. To study and prepare a report on the constructional details, working properation of the automotive drive lines and differentials. To study and prepare reports on the constructional details of working properation of the Automotive Steering Systems. To study and prepare a report on the construction details, working properation of the Automotive Suspension Systems. To study and prepare a report on the construction details, working operation of the Automotive Suspension Systems. To study and prepare a report on the construction details, working operation of the Automotive Brake systems. To study and prepare a report on the construction details, working operation of Electric vehicle To study and prepare a report on the construction details, working operation of Electric vehicle To study and prepare a report on the construction details, working operation of Electric vehicle To study and prepare a report on the construction details, working operation of Electric vehicle 	principles principles principles principles principles principle principle ology in complete	s of the s of the es, and s of the es, and es, and es, and electric

^{1.} Automobile Engg. TR Banga&Nathu Singh.

- 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



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Mechanical Engineering Department

Semest	Semester/Year VI/III Program B.Tech.									
Subject	DLC	Subject	MEI 366	Subj	Subject		ТАТ	2 111		
Category	DLC	Code:	MILL 300	Name:		LAD-III				
Maximum Marks Allotted								tact Hoi	ire	
	Theory		Practical			Total	Con		115	Total
End	Mid Som	Ouiz	End Sem	Lab-	Ouiz	Marks	т	т	D	Credits
Sem	Mild-Sell	Quiz	End Sem	Work	Quiz	IVIAI KS	L	1	1	
-	-	-	30	20	10	50		1	2	2

Prerequisites:(Only for open electives)

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 geometries analysis
- 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	PO1	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
		1				Contents	5:		1		•	
UNITS	5	Descriptions									Hrs.	CO's
	Hands on exposure will be provided on some of the elective 30 subjects that are included in V and VI semester under departmental											

	category. Objective of this is to provi	ide introductory exposure to
	subjects which could not be included as	s regular subjects.
	Practical sessions includes industrial	and academic examples for
	learning how to apply Ansys Workbe	ench software for efficiently
	performing different kinds of Simulatio	ns, HyperMesh
Guest Lec	tures (if any)	
Total Ho	irs	
Suggestiv	e list of experiments: (if any)	
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
Text Book		
1.		
Reference	Books-	
1.		
Modes of	Evaluation and Rubric	
There wi	ll be continuous evaluation for during the	semester for 40 sessional marks and 60 semester
End term	Marks. The practical marks are 50, out of y	which 30 marks will be awarded for viva voce and
20 marks	for lab work. Out of 40 sessional marks. 2	0 shall be awarded for Mid semester. 20 marks to
be award	led for day to day performance and Ouiz	Assignments, For the 60 Marks, there will be a
semester	$-$ End examination as per the norms of ΔIC	TE
Recomme	ndation by Board of studies on	Date:
Approval	by Academic council on	Date:
Compiled	and designed by	Name 1.Dr. Chandra Pal Singh
Complica	una acordina dy	Name 2:
Checked	nd approved by	Name 1 Prof Sandson Jain
CHUCKEU &		



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Mechanical Engineering Department

Semester/Year		VI/III	Prog	Program			B.Tech.					
Subject		Subject	MEL	-	bioct No	mai	Internetin II & Cominer					
Categor	y DLC	Code:	367	50	DJECT NA							
Maximu	m Marks Allo	tted						Conta	ct Ho	urc	Total	
Theory				Practical			Total	contact nours			Credits	
End	Mid Som	Accignment	Oui-	End	Lab-	Quiz	Marke		т	D		
Sem	wild-Selli	Assignment	Quiz	Sem	Work		IVIAL KS	L	1	F		
				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	De	Descriptions								Hrs.	CO's	
I	Ар	Applied Engineering Knowledge and Skills 4 1								1		
11	Pro	Professional and Ethical Behavior 4 2							2			
111	Pro	Project Management and Execution 4 3							3			
IV	Co	Communication and Teamwork							4	4		
V	Cri	Critical Thinking and Problem-Solving								4	5	
Guest Le	Guest Lectures (if any)											
Total Hours								20				
Modes of Evaluation and Rubric												

Performance Indicator	Poor	Fair	Good	Excellent	PO's
	(50% OF	(60%	(80%	(100%	
	A/B/C/D/E)	A/B/C/D/E)	A/B/C/D/E)	A/B/C/D/E)	
[A] Timeline	Not scheduled	Not scheduled	Scheduled but	Scheduled and	PO8,
scheduled.	and not	and not	not followed	followed strictly	PO11
[MARKS=10% OF	followed	followed	strictly		
MAXIMUM					
MARKS]					
		<u> </u>			201
IDI Lloggo of the latest	N a lataat			latact	107 15
[b] Usage of the fatest	No fatest	Singnuy	Moderate Usage	latest	POS
application and	applications and	Outdated	of new	applications and	POS
application and software	applications and software's used	Outdated	of new technology	applications and software are	P03
application and software	applications and software's used	Outdated	of new technology	applications and software are used	POJ
application and software [MARKS= 10% OF	applications and software's used	Outdated	of new technology	applications and software are used	POJ
application and software [MARKS= 10% OF MAXIMUM MARKS]	applications and software's used	Outdated	of new technology	applications and software are used	POJ
[B] Usage of the latest application and software [MARKS= 10% OF MAXIMUM MARKS]	applications and software's used	Outdated	of new technology	applications and software are used	PO3
application and software [MARKS= 10% OF MAXIMUM MARKS] [C] Proper	applications and software's used	Average	of new technology Good	applications and software are used Excellent	PO3 PO10
 [B] Usage of the latest application and software [MARKS= 10% OF MAXIMUM MARKS] [C] Proper documentation work 	A plications and software's used Poor Documentation	Average documentation	Good Documentation	applications and software are used Excellent Documentation	PO3

[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