Name of all programs adopting elective course system: Mechanical(Design) **Program code:**

Details of Elective options offered by the University and those opted by the Institute:

Academic Year	Semister (Sem-I or II)	Name of Class	Name of Elective Subject	Numer of Students opted
2017-18	Sem-I	ME Mech-I (2017)	**Elective-I**	
			Module-1 Energy Audit & Management, Project management.	 12 12
			Module-2 Environmental Pollution & Control	12
	Sem-I	ME Mech-II(2013)	**Elective-III**	
			Module-1 Industrial Tribology-I Industrial Tribology-II	 6 6
			Module-2 Reliability Engineering	6
	Sem-II	ME Mech-I (2017)	**Elective-II**	
			Module-1 Acoustic & Noise Control -I Vehicle Dynamics-I	 12 12
			Module-2 Process Equipment Design	12

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SIR VISVESVARAYA INSTITUTE OF TECHNOLOGY,CHINCHOLI,NASHIK
DEPARTMENT OF MECHANICAL ENGINEERING
Elective-I

CLASS -M.E.(Design Engg.) I **Academic Year-2017-18**

Roll No	Name	Module-I	Module-II	Module-III
1	Aware Poonam Rajendra	Energy Audit & Management	Project management	Environmental Pollution & Control
2	Deore Manish Anantrao	Energy Audit & Management	Project management	Environmental Pollution & Control
3	Dhande Kajal Dnyaneshwar	Energy Audit & Management	Project management	Environmental Pollution & Control
4	Dheringe Shekhar Rajaram	Energy Audit & Management	Project management	Environmental Pollution & Control
5	Gaidhani Tushar Balu	Energy Audit & Management	Project management	Environmental Pollution & Control
6	Kadam Mukti Pramod	Energy Audit & Management	Project management	Environmental Pollution & Control
7	Kolhe Renuka Tejkumar	Energy Audit & Management	Project management	Environmental Pollution & Control
8	Sangale Swati Somnath	Energy Audit & Management	Project management	Environmental Pollution & Control
9	Shinde Amol Bhanudas	Energy Audit & Management	Project management	Environmental Pollution & Control
10	Wable Pushkar Kaushiram	Energy Audit & Management	Project management	Environmental Pollution & Control
11	Avhad Mayur Vishnu	Energy Audit & Management	Project management	Environmental Pollution & Control
12	Shinde Ganesh Revaji	Energy Audit & Management	Project management	Environmental Pollution & Control

SIR VISVESVARAYA INSTITUTE OF TECHNOLOGY,CHINCHOLI,NASHIK
DEPARTMENT OF MECHANICAL ENGINEERING
Elective-III

CLASS -M.E.(Design Engg.) I **Sem-I** **Academic Year-2017-18**

Roll No	Name	Module-I (Suject-1)	Module-I (Subject-2)	Module-II
1	Ganjwe Nishant Pandharinath	Industrial Tribology-I	Industrial Tribology-II	Reliability Engineering
2	Khandare Ganesh Nilesh	Industrial Tribology-I	Industrial Tribology-II	Reliability Engineering
3	Gaidhani Nilesh Vishram	Industrial Tribology-I	Industrial Tribology-II	Reliability Engineering

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4	Borate Tapasya Jayram	Industrial Tribology-I	Industrial Tribology-II	Reliability Engineering
5	Kulkarni Parag Satish	Industrial Tribology-I	Industrial Tribology-II	Reliability Engineering
6	Nathe Ganesh Dnyaneshwar	Industrial Tribology-I	Industrial Tribology-II	Reliability Engineering

SIR VISVESVARAYA INSTITUTE OF TECHNOLOGY,CHINCHOLI,NASHIK
DEPARTMENT OF MECHANICAL ENGINEERING
Elective-II
CLASS -M.E.(Design Engg.) I Sem-II Academic Year-2017-18

Roll No	Name	Module-I	Module-II	Module-III
1	Aware Poonam Rajendra	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
2	Deore Manish Anantrao	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
3	Dhande Kajal Dnyaneshwar	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
4	Dheringe Shekhar Rajaram	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
5	Gaidhani Tushar Balu	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
6	Kadam Mukti Pramod	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
7	Kolhe Renuka Tejkumar	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
8	Sangale Swati Somnath	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
9	Shinde Amol Bhanudas	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
10	Wable Pushkar Kaushiram	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
11	Avhad Mayur Vishnu	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design
12	Shinde Ganesh Revaji	Acoustic & Noise Control -I	Vehicle Dynamics-I	Process Equipment Design

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M.E. Mechanical Engineering (Design Engineering) - 2017 Course

SEMESTER I

CODE	SUBJECT	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
		Lect./ Pr	Paper		TW	Oral/ Presentation	Total	
			In Semester Assessment	End Semester Assessment				
507201	Advanced Mathematics@	4	50	50	-	-	100	4
502202	Material Science and Mechanical Behavior of Materials	4	50	50	-	-	100	4
502203	Advanced Stress Analysis	4	50	50	-	-	100	4
502104	Research Methodology	4	50	50	-	-	100	4
502205	Elective I**	5	50	50	-	-	100	5
502206	Lab Practice I	4			50	50	100	4
	Total	25	250	250	50	50	600	25

SEMESTER II

CODE	SUBJECT	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
		Lect./ Pr	Paper		TW	Oral/ Presentation	Total	
			In Semester Assessment	End Semester Assessment				
502207	Analysis and Synthesis of Mechanisms	4	50	50	-	-	100	4
502208	Advanced Mechanical Vibrations	4	50	50	-	-	100	4
502209	Finite Element Method	4	50	50	-	-	100	4
502210	Elective II	5	50	50	-	-	100	5
502211	Lab Practice II	4	-	-	50	50	100	4
502212	Seminar I	4	-	-	50	50	100	4
Total		25	200	200	100	100	600	25

Note:
Elective I: Common to All M.E. Mechanical Specializations**
@ Syllabus is common with Automotive Engineering. Hence End Semester examination paper will be same.

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Semester – I
Elective – I [502205]

CODE	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
	Lect. /Week	Paper		TW	Oral/ Presentation	Total	
		In Semester Assessment	End Semester Assessment				
502205	5	50	50	-	-	100	5

Modules of 2 Credits (Select any Two)			
Code No.	**Title**	**Code No.**	**Title**
ME2I – M1	Energy Audit and Management	**ME2I – M6**	Operation Management
ME2I – M2	Financial Management	**ME2I – M7**	Engineering Economics
ME2I – M3	Financial Costing	**ME2I – M8**	Technology Forecasting
ME2I – M4	Project Management	**ME2I – M9**	Technology Transfer
ME2I – M5	Energy Efficient Technologies in Electrical Systems	**ME2I – M10**	Human Rights
Modules of 1 Credit (Select any One)			
Code No.	**Title**	**Code No.**	**Title**
ME1I – M11	Environmental Pollution and Control	**ME1I – M12**	Intellectual property Rights

Note: For e.g., ME2I-M1 indicates
ME – Common to all M.E. Mechanical Course, 2 – 2 Credits, I – Elective I, M1 – Module 1

ME2I – M1 Energy Audit and Management
Definition, Energy audit- need, Types of energy audit, Energy management (audit) approach-understanding energy costs, Bench marking, Energy performance, Matching energy use to requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel and energy substitution, Energy audit instruments
Ref. Books: Guide Books, Bureau of Energy Efficiency

ME2I – M2 Financial Management
Investment-need, Appraisal and criteria, Financial analysis techniques- Simple payback period, Return on investment, Net present value, Internal rate of return, Cash flows, Risk and sensitivity analysis, Financing options, Energy performance contracting and role of Energy Service Companies (ESCOS).
Ref. Books: Guide Books, Bureau of Energy Efficiency

ME2I – M3 Financial Costing
Significance, Traditional absorption costing, Marginal costing, Contract costing, Activity based costing, Process costing
Ref. Books: Cost Accounting, N K Prasad, Book Syndicate Pvt. Ltd.

ME2I – M4 Project Management
Definition and scope of project, Technical design, Financing, Contracting, Implementation and performance monitoring, Implementation plan for top management, Planning Budget, Procurement Procedures, Construction, Measurement and Verification
Ref. Books: Guide Books, Bureau of Energy Efficiency

ME2I – M5 Energy Efficient Technologies in Electrical Systems

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Semester – II
Elective II [502210]

CODE	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
	Lect. /Week	Paper		TW	Oral/ Presentation	Total	
		In Semester Assessment	End Semester Assessment				
502210	5	50	50	-	-	100	5

Modules of 2 Credits (Select any Two)			
Code No.	**Title**	**Code No.**	**Title**
DE2II-M1	Vehicle Dynamics – I	**DE2II-M5**	Mechanics of Composites
DE2II-M2	Vehicle Dynamics – II	**DE2II-M6**	Design of Composite Structure
DE2II-M3	Design of Material Handling Equipment – I	**DE2II-M7**	Acoustics and Noise Control - I
DE2II-M4	Design of Material Handling Equipment – II	**DE2II-M8**	Acoustics and Noise Control – II
Modules of 1 Credit (Select any One)			
Code No.	**Title**	**Code No.**	**Title**
DE1II-M9	Design of Piping System	**DE1II-M11**	Dynamics of Structures
DE1II-M10	Process Equipment Design	**DE1II-M12**	Robotics

Note: For e.g., DE2II-M1 indicates
DE – Design Engineering, 2 – 2 Credits, II – Elective II, M1 – Module 1
For e.g., DE1II-M12 indicates
DE – Design Engineering, 1 – 1 Credit, II – Elective II, M12 – Module 12

DE2II-M1 Vehicle Dynamics - I

Tire Characteristics - Tire – types, axis system, mechanics of pneumatic tires - tire forces and moments, rolling resistance of tires, tractive (braking) effort and longitudinal slip (skid), cornering properties of tires, slip angle and cornering force, slip angle and aligning torque, camber and camber thrust, characterization of cornering behaviour of tires, performance of tires on wet surfaces, ride properties of tires

Performance characteristics of road vehicles - Equation of motion and maximum tractive effort, aerodynamic forces and moments, vehicle power plant and transmission characteristics, acceleration time and distance, gradability, engine and transmission matching, Electronic Stability Control (ESC), Braking characteristics of a two-axle vehicle, braking efficiency and stopping distance, antilock brake systems, traction control systems, Electronic Brakeforce Distribution (EBD), Electronic Brake assist System (EBS)

Suspension Kinematics - Terminology, definitions – reference frame, toe-in, toe-out, wheel camber, caster and kingpin angle, steering offset, types of dependent and independent suspensions, equivalent mechanisms (front view / side view), anti-dive and squat geometry, roll center analysis, steering geometry, error, steering force and moments

Ref. Books: 1) Road Vehicle Dynamics – Problems & Solutions, Rao & Dukkipati, SAE, 2) Theory of Ground Vehicles, J.Y. Wong, John Wiley & Sons, 3) Fundamentals of Vehicle Dynamics, T.D. Gillespie, SAE

DE2II-M2 Vehicle Dynamics - II

Handling characteristics of vehicle - Steady-state handling characteristics of a two-axle vehicle, steady-state response to steering input, testing of handling characteristics, transient response characteristics, directional stability, steering of tracked vehicles

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SEMESTER III

CODE	SUBJECT	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
		Lect./ Pr	Paper		TW	Oral/ Presentation	Total	
			In Semester Assessment	End Semester Assessment				
602213	Optimization Techniques	4	50	50	-	-	100	4
602214	Mechanical Measurements and Controls	4	50	50	-	-	100	4
602215	Elective III	5	50	50	-	-	100	5
602216	Seminar II	4	-	-	50	50	100	4
602217	Project Stage I	08	-	-	50	50	100	8
Total		25	150	150	100	100	500	25

SEMESTER IV

CODE	SUBJECT	TEACHING SCHEME	EXAMINATION SCHEME				CREDITS
		Lect./ Pr	Paper	TW	Oral/ presentation	Total	
602218	Seminar III	5	-	50	50	100	5
602219	Project Work Stage II	20	-	150	50	200	20
Total		25	-	200	100	300	25

Lab Practice I & II:
The laboratory work will be based on completion of assignments confined to the courses of that semester.

SEMINAR:
The student shall deliver the seminar on a topic approved by authorities.

Seminar I : shall be on state of the art topic of student's own choice approved by authority. The student shall submit the seminar report in standard format, duly certified for satisfactory completion of the work by the concerned Guide and head of the department/institute.

Seminar II : shall be on the topic relevant to latest trends in the field of concerned branch, preferably on the topic of specialization based on the electives selected by him/her approved by authority. The student shall submit the seminar report in standard format, duly certified for satisfactory completion of the work by the concerned Guide and head of the department/institute.

Seminar III: shall be extension of **seminar II.** The student shall submit the seminar report in standard format, duly certified for satisfactory completion of the work by the concerned Guide and head of the department/institute.

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Semester – III
Elective – III [602215]

CODE	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
	Lect. /Week	Paper		TW	Oral/ Presentation	Total	
		In Semester Assessment	End Semester Assessment				
602215	5	50	50	-	-	100	5

Modules of 2 Credits (Select any Two)			
Code No.	Title	Code No.	Title
DE2III-M1	Fatigue	DE2III-M5	Condition Monitoring – I
DE2III-M2	Fracture Mechanics	DE2III-M6	Condition Monitoring – II
DE2III-M3	CAE – I	DE2III-M7	Industrial Tribology – I
DE2III-M4	CAE – II	DE2III-M8	Industrial Tribology – II
Modules of 1 Credit (Select any One)			
Code No.	Title	Code No.	Title
DE1III-M9	Reliability Engineering	DE1III-M11	Fatigue Analysis using FEM
DE1III-M10	Design for X	DE1III-M12	Product Life Cycle Management

DE2III-M1 Fatigue

Fatigue Mechanics

Time varying uniaxial, biaxial and multiaxial loading of components, load spectra, cycle counting, fatigue damage theories of crack initiation, stress based and strain based approach

Fatigue Testing

Data acquisition and instrumentation, classical methods of fatigue testing, ASTM standards - specimen preparation, procedure

Advanced Topics in Fatigue

Fatigue analysis in frequency domain, vibration fatigue, fatigue of welded structure, corrosion fatigue, high temperature and low temperature fatigue

Ref. Books: 1) Metal Fatigue Analysis Handbook, YUNG-LI LEE, Elsevier 2) Design & Analysis of Fatigue Resistant Welded Structure, Dieter Radaj, Woodhead Publishing 3) Fatigue of Structures and Materials, Japp Schijve, Kluwer Academic. 4) Fatigue Testing and Analysis – Theory and Practice, YUNG-LI LEE, Elsevier 5) Metal Fatigue in Engineering, Ali Fatemi, Wiley-Interscience

DE2III-M2 Fracture Mechanics

Linear Elastic Fracture Mechanics

Mechanisms of fracture, initiation of fracture and crack propagation, stress and energy criteria and fracture - effects of geometry, Inglis theory of stress, energy concept – Griffith theory of fracture, energy balance during crack growth, modes of loading, calculation of stress intensity – center crack, single edge crack, double edge crack, round hole with crack, superposition of stress intensity factors, leak before break criterion, experimental determination of stress intensity factor – strain gauge method, optical method of photo elasticity

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