



**VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)**

Affiliated to **JNTUH**, Approved by **AICTE**, Accredited by **NAAC** with **A++** Grade, **ISO 9001:2015** Certified
Kacharam, Shamshabad, Hyderabad – 501218, Telangana, India

DEPARTMENT OF MECHANICAL ENGINEERING

Curriculum Structure

Details of various courses presented in terms of teaching and learning scheme in VCE-R25

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
Regulation: VCE-R25							
I Year I Semester							
Theory Courses							
A9001	Matrices and Calculus	45	15	--	60	120	4
A9009	Engineering Chemistry	45	--	--	45	90	3
A9501	Programming for Problem Solving	45	--	--	45	90	3
A9011	English for Skill Enhancement	30	--	--	30	60	2
A9301	Engineering Drawing	15	--	60	15	90	3
Practical Courses							
A9010	Engineering Chemistry Laboratory	--	--	30	--	30	1
A9502	Programming for Problem Solving Laboratory	--	--	30	--	30	1
A9012	English Language and Communication Skills Laboratory	--	--	30	--	30	1
A9302	Engineering Workshop	--	--	30	--	30	1

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
Community Related Project Work							
A9021	Community Centered Design Thinking	--	--	--	45	45	1
I Year II Semester							
Theory Courses							
A9002	Ordinary Differential Equations and Vector Calculus	45	15	--	60	120	4
A9007	Engineering Physics	45	--	--	45	90	3
A9303	Engineering Mechanics	45	--	--	45	90	3
A9503	Data Structures	45	--	--	45	90	3
A9209	Basic Electrical and Electronics Engineering	45	--	--	45	90	3
Practical Courses							
A9008	Engineering Physics Laboratory	--	--	30	--	30	1
A9504	Data Structures Laboratory	--	--	30	--	30	1
A9305	Computer Aided Machine Drawing	--	--	30	--	30	1
Community Related Project Work							
A9022	Product Design and Development	--	--	--	45	45	1
II Year I Semester							
Theory Courses							
A9014	Business Economics and Financial Analysis	45	--	--	45	90	3
A9306	Material Science and Metallurgy	45	--	--	45	90	3
A9307	Production Technology	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A9308	Mechanics of Solids	45	15	--	60	120	4
A9309	Thermodynamics	45	--	--	45	90	3
Practical Courses							
A9310	Production Technology Laboratory	--	--	30	--	30	1
A9311	Material Science and Mechanics of Solids Laboratory	--	--	30	--	30	1
A9603	Python Programming Laboratory	--	--	30	--	30	1
Skill Development Course							
A9312	Drafting and Modelling	--	--	30	--	30	1
Community Related Project Work							
A9023	Technology Entrepreneurship	--	--	--	45	45	1
II Year II Semester							
Theory Courses							
A9004	Probability Distributions and Statistics	45	--	--	45	90	3
A9313	Kinematics of Machinery	45	--	--	45	90	3
A9314	Thermal Engineering-I	45	--	--	45	90	3
A9315	Fluid Mechanics and Hydraulic Machines	45	--	--	45	90	3
A9316	Metrology and Machine Tools	45	--	--	45	90	3
Practical Courses							
A9317	Fluid Mechanics and Hydraulic Machines Laboratory	--	--	30	--	30	1
A9318	Thermal Engineering Laboratory	--	--	30	--	30	1

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A9319	Metrology and Machine Tools Laboratory	--	--	30	--	30	1
A9006	Computational Mathematics Laboratory	--	--	30	--	30	1
Skill Development Course							
A9320	Rapid Prototyping	--	--	30	--	30	1
Community Related Project Work							
A9024	Community Driven Product Evaluation	--	--	--	45	45	1
	Exit Optional: Work Based Vocational Course / Internship or Apprenticeship	--	--	--	90	90	2
III Year I Semester							
Theory Courses							
A9321	Dynamics of Machinery	45	--	--	45	90	3
A9322	Thermal Engineering-II	45	--	--	45	90	3
A9323	Design of Machine Elements	45	--	--	45	90	3
	Professional Elective - I	45	--	--	45	90	3
	Open Elective - I	45	--	--	45	90	3
Practical Courses							
A9324	Dynamics of Machinery Laboratory	--	--	30	--	30	1
A9013	English for Employability Skills Laboratory	--	--	30	--	30	1
Skill Development Course							
A9325	Heating, Ventilation, and Air Conditioning- HVAC	--	--	30	--	30	1
Experiential Learning Course							

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A9041	Internship/Industrial Training	--	--	--	90	90	2
Value Added Course							
A9016	Gender Sensitization, Human Values and Professional Ethics	15	--	--	15	30	1
III Year II Semester							
Theory Courses							
A9326	Heat Transfer	45	--	--	45	90	3
A9327	Machine Design	45	--	--	45	90	3
A9328	Finite Element Methods	45	--	--	45	90	3
	Professional Elective - II	45	--	--	45	90	3
	Open Elective - II	45	--	--	45	90	3
Practical Courses							
A9329	Heat Transfer Laboratory	--	--	30	--	30	1
A9330	Computer Aided Engineering Laboratory	--	--	30	--	30	1
Skill Development Course							
A9331	Industrial Automation	--	--	30	--	30	1
Experiential Learning Course							
A9042	Mini Project	--	--	--	90	90	2
Value Added Course							
A9015	Environmental Science	15	--	--	15	30	1
IV Year I Semester							
Theory Courses							
A9332	Computer Integrated Manufacturing	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A9333	Instrumentation and Control Systems	45	--	--	45	90	3
	Professional Elective - III	45	--	--	45	90	3
	Professional Elective - IV	45	--	--	45	90	3
	Open Elective - III	45	--	--	45	90	3
Practical Courses							
A9334	Instrumentation Laboratory	--	--	30	--	30	1
A9335	Computer Integrated Manufacturing Laboratory	--	--	30	--	30	1
Experiential Learning Course							
A9043	Major Project – Phase I	--	--	--	90	90	2
Value Added Course							
A9017	Indian Knowledge System	15	--	--	15	30	1
IV Year II Semester							
Theory Courses							
	Professional Elective – V	45	--	--	45	90	3
	Professional Elective – VI	45	--	--	45	90	3
Experiential Learning Course							
A9044	Major Project – Phase II	--	--	--	630	630	14

List of Professional Electives

List of Professional Electives			
Domain: Manufacturing			
Year & Semester	Professional Elective #	Course Code	Title of the Course
III B.Tech. I Semester	Professional Elective – I	A9351	Additive Manufacturing
III B.Tech. I Semester	Professional Elective – II	A9355	Operations Research
IV B.Tech. I Semester	Professional Elective – III	A9359	Robotics
IV B.Tech. I Semester	Professional Elective – IV	A9363	Supply Chain Management
IV B.Tech. II Semester	Professional Elective – V	A9367	Total Quality Management
IV B.Tech. II Semester	Professional Elective – VI	A9371	Production Planning and Control

Domain: Thermal			
Year & Semester	Professional Elective #	Course Code	Title of the Course
III B.Tech. I Semester	Professional Elective – I	A9352	Automobile Engineering
III B.Tech. I Semester	Professional Elective – II	A9356	Turbomachinery
IV B.Tech. I Semester	Professional Elective – III	A9360	Refrigeration and Air Conditioning
IV B.Tech. I Semester	Professional Elective – IV	A9364	Fluid Power Systems
IV B.Tech. II Semester	Professional Elective – V	A9368	Computational Fluid Dynamics
IV B.Tech. II Semester	Professional Elective – VI	A9372	Power Plant Engineering

Domain: Materials and Design			
Year & Semester	Professional Elective #	Course Code	Title of the Course
III B.Tech. I Semester	Professional Elective – I	A9353	Composite Materials
III B.Tech. I Semester	Professional Elective – II	A9357	Mechanical Vibrations
IV B.Tech. I Semester	Professional Elective – III	A9361	Engineering Tribology
IV B.Tech. I Semester	Professional Elective – IV	A9365	Design of Jigs and Fixtures
IV B.Tech. II Semester	Professional Elective – V	A9369	Advanced Mechanics of Solids
IV B.Tech. II Semester	Professional Elective – VI	A9373	Smart Materials and Applications

Domain: Thermal			
Year & Semester	Professional Elective #	Course Code	Title of the Course
III B.Tech. I Semester	Professional Elective – I	A9354	Electric and Hybrid Vehicles
III B.Tech. I Semester	Professional Elective – II	A9358	Renewable Energy Sources
IV B.Tech. I Semester	Professional Elective – III	A9362	Fuzzy Logic and Neural Networks
IV B.Tech. I Semester	Professional Elective – IV	A9366	Mechatronics System Development
IV B.Tech. II Semester	Professional Elective – V	A9370	Machine Learning for Mechanical Systems
IV B.Tech. II Semester	Professional Elective – VI	A9374	Industry 4.0

List of Open Electives

List of Open Electives		
S.No.	Course Code	Title of the Course
1	A9505	Computer Organization
2	A9507	Operating Systems
3	A9509	Database Management Systems
4	A9515	Software Engineering
5	A9604	Web Application Engineering
6	A9612	Information Security
7	A9681	Cyber Security
8	A9682	Java Programming
9	A9683	Prompt Engineering
10	A9701	Artificial Intelligence
11	A9702	Machine Learning
12	A9705	Deep Learning
13	A9707	Natural Language Processing
14	A9710	Generative AI
15	A9803	Data Mining
16	A9851	Data Science for Engineers
Emerging Technologies		
17	A9381	Fundamentals of Robotics
18	A9382	Introduction to 3DPrinting
19	A9383	Hybrid Vehicles
20	A9481	Internet of Things (IoT)
21	A9482	Consumer Electronics
22	A9483	VLSI Design Fundamentals
23	A9484	PCB Design and Fabrication
24	A9656	Blockchain Technology
Sustainability		
25	A9166	Smart Cities
26	A9181	Disaster Management
27	A9182	Road Safety Engineering
28	A9183	Building Science and Technology
29	A9281	Renewable Energy Systems
30	A9282	Smart Grid Technologies
31	A9283	Electrical Safety and Sustainable Engineering Practices
32	A9284	Smart Power Systems for Data Centers
33	A9285	E-Waste Management
Entrepreneurship		
34	A9081	Entrepreneurship Development
35	A9082	Research Methodology and IPR
36	A9083	Principles of Management
37	A9084	Organizational Behavior
38	A9355	Operations Research
39	A9684	E-Commerce
Life Skills and Holistic Development		
40	A9085	Emotional Intelligence and Leadership
41	A9086	Yoga and Wellness
42	A9087	National Cadet Corps (NCC)

Details of various courses presented in terms of teaching and learning scheme in VCE-R22

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
Regulation: VCE-R22							
I Year I Semester							
A8001	Matrices and Calculus	45	15	--	60	120	4
A8006	Applied Physics	45	--	--	45	90	3
A8501	Problem Solving through C	45	--	--	45	90	3
A8304	Engineering Materials	45	--	--	45	90	3
A8303	Engineering Drawing	15	--	60	15	90	3
A8007	Applied Physics Laboratory	--	--	30	--	30	1
A8502	Problem Solving through C Laboratory	--	--	30	--	30	1
A8301	Engineering Workshop	--	--	30	--	30	1
A8021	Social Innovation	--	--	30	--	30	1
I Year II Semester							
A8002	Ordinary Differential Equations and Vector Calculus	45	15	--	60	120	4
A8008	Engineering Chemistry	45	--	--	45	90	3
A8010	English for Skill Enhancement	30	--	--	30	60	2
A8505	Data Structures	45	--	--	45	90	3
A8305	Engineering Mechanics	45	--	--	45	90	3
A8009	Engineering Chemistry Laboratory	--	--	30	--	30	1
A8011	English Language Communication Skills Laboratory	--	--	30	--	30	1
A8507	Data Structures Laboratory	--	--	30	--	30	1

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A8302	Computer Aided Drawing	--	--	30	--	30	1
A8022	Engineering Exploration	--	--	30	--	30	1
II Year I Semester							
A8003	Probability Distributions and Statistics	45	15	--	60	120	4
A8306	Material Science and Metallurgy	45	--	--	45	90	3
A8307	Mechanics of Solids	45	--	--	45	90	3
A8212	Basic Electrical and Electronics Engineering	45	--	--	45	90	3
A8308	Thermodynamics	45	--	--	45	90	3
A8309	Material Science and Metallurgy Laboratory	--	--	30	--	30	1
A8310	Mechanics of Solids Laboratory	--	--	30	--	30	1
A8311	Computer Aided Machine Drawing	--	--	30	--	30	1
A8023	Engineering Design Thinking	--	--	30	--	30	1
A8031	Gender Sensitization	30	--	--	--	30	0
A8033	Universal Human Values 2: Understanding Harmony	30	--	--	--	30	0
II Year II Semester							
A8013	Business Economics and Financial Analysis	45	--	--	45	90	3
A8312	Kinematics of Machinery	45	--	--	45	90	3
A8313	Thermal Engineering-I	45	--	--	45	90	3
A8314	Fluid Mechanics and Hydraulic Machines	45	15	--	60	120	4
A8315	Production Technology	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A8316	Fluid Mechanics and Hydraulic Machines Laboratory	--	--	30	--	30	1
A8317	Thermal Engineering Laboratory	--	--	30	--	30	1
A8318	Production Technology Laboratory	--	--	30	--	30	1
A8024	Product Realization	--	--	30	--	30	1
A8032	Environmental Science and Technology	30	--	--	--	30	0
III Year I Semester							
A8319	Dynamics of Machinery	45	--	--	45	90	3
A8320	Metrology and Machine Tools	45	--	--	45	90	3
A8321	Design of Machine Elements	45	15	--	60	120	4
A8322	Thermal Engineering-II	45	15	--	60	120	4
A8353	Automation in Manufacturing (PE-I)	45	--	--	45	90	3
A8323	Metrology and Machine Tools Laboratory	--	--	30	--	30	1
A8324	Dynamics of Machinery Laboratory	--	--	30	--	30	1
A8325	Engineering Design Laboratory	--	--	30	--	30	1
A8034	Indian Constitution	30	--	--	--	30	0
III Year II Semester							
A8326	Heat Transfer	45	--	--	45	90	3
A8327	Machine Design	45	--	--	45	90	3
A8328	Finite Element Methods	30	--	--	30	60	2
A8355	Automobile Engineering (PE- II)	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A8360	Composite Materials (PE-III)	45	--	--	45	90	3
A8329	Heat Transfer Laboratory	--	--	30	--	30	1
A8330	Numerical Simulation Laboratory	--	--	30	--	30	1
A8012	Advanced English Communication Skills Laboratory	--	--	30	--	30	1
A8331	Fundamentals of HVAC	--	--	30	--	30	1
A8041	Mini-Project/Internship	--	--	60	--	60	2
A8035	Research Methodology	30	--	--	--	30	0
IV Year I Semester							
A8332	Instrumentation and Control Systems	45	--	--	45	90	3
A8333	CIM and Robotics	45	--	--	45	90	3
A8365	Renewable Energy Sources (PE-IV)	45	--	--	45	90	3
A8369	Unconventional Machining Processes (PE-V)	45	--	--	45	90	3
A8086	Management Science (OE-I)	45	--	--	45	90	3
A8334	Instrumentation Laboratory	--	--	30	--	30	1
A8335	CIM and Robotics Laboratory	--	--	30	--	30	1
A8042	Project Work Phase – I	--	--	90	--	90	3
IV Year II Semester							
A8374	Total Quality Management (PE – VI)	45	--	--	45	90	3
A8281	Solar Energy and Applications (OE – II)	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A8084	Entrepreneurship Development (OE – III)	45	--	--	45	90	3
A8043	Project Work Phase - II	--	--	330	--	330	11

*This is as per the new National Credit Framework, which accounts for 30 hrs. of learning as equivalent to 1 credit. Those universities which are still following the LTP will transform them into no. of hours and fill in the above table.

List of Professional Electives

List of Professional Electives		
Professional Elective - VI		
S.No.	Course Code	Title of the Course
1	A8371	Artificial Intelligence in Mechanical Systems
2	A8372	Machine Learning in Mechanical Engineering
3	A8373	Production Planning and Control
4	A8374	Total Quality Management

List of Open Electives

List of Open Electives		
S.No.	Course Code	Title of the Course
1	A8181	Smart Cities
2	A8182	Disaster Management
3	A8183	Environmental Pollution Management
4	A8155	Green Building and Sustainability
5	A8224	Electric Vehicles
6	A8281	Solar Energy and Applications
7	A8282	Energy Storage Systems
8	A8283	Power Generation Systems
9	A8381	Hybrid Vehicles
10	A8382	Fundamentals of Robotics
11	A8383	3D Printing
12	A8402	Digital Electronics
13	A8481	Basic Electronics
14	A8482	Principles of Communication Engineering
15	A8483	Fundamentals of IoT
16	A8484	Introduction to Embedded Systems
17	A8510	Operating Systems
18	A8514	Database Management Systems
19	A8520	Software Engineering
20	A8607	Information Security
21	A8608	Java Programming

22	A8651	Ethical Hacking
23	A8652	Cyber Security
24	A8656	Blockchain Technology
25	A8658	Robotic Process Automation
26	A8681	E-Commerce
27	A8682	Full Stack Development
28	A8702	Artificial Intelligence
29	A8781	Computer Organization and Architecture
30	A8851	Data Science for Engineers
31	A8081	Mathematical Programming
32	A8082	Transform Calculus
33	A8083	Numerical Techniques
34	A8084	Entrepreneurship Development
35	A8085	Logistics and Supply Chain Management
36	A8086	Management Science
37	A8087	Human Resource Management
38	A8088	Organizational Behaviour
39	A8089	Intellectual Property Rights
40	A8090	Professional Practice, Law & Ethics
41	A8091	National Cadet Corps (NCC)

Legend:

- C1: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture (L), Tutorial (T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- L1: Laboratory Instruction (Includes experiments /practical performances /problem based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
- TW: Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc. (If provided in curriculum structure.)

Details of various courses presented in terms of teaching and learning scheme in VCE-R21

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
Regulation: VCE-R21							
I Year I Semester							
A7001	Linear Algebra and Ordinary Differential Equations	45	15	--	60	120	4
A7009	Engineering Physics	30	--	30	30	90	3
A7016	English for Communication	30	--	30	30	90	3
A7501	Problem Solving through C	30	--	30	30	90	3
A7301	Engineering Graphics	15	--	60	15	90	3
A7302	Engineering Workshop Practice	0	--	60	--	60	2
A7021	Social Innovation	0	--	30	--	30	1
I Year II Semester							
A7002	Advanced Calculus and Partial Differential Equations	45	--	--	30	90	3
A7012	Materials Chemistry	30	--	30	30	90	3
A7017	Business English	15	--	30	15	60	2
A7502	Data Structures	30	--	30	30	90	3
A7304	Engineering Mechanics	45	--	30	45	120	4
A7305	Quantum Mechanics for Engineers	30	--	--	30	60	2
A7503	Python Programming	--	--	30	--	30	1
A7022	Engineering Exploration	--	--	30	--	30	1
II Year I Semester							
A7006	Probability Distributions and Statistics	45	15	--	60	120	4
A7209	Basic Electrical and Electronics Engineering	30	--	30	30	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A7306	Mechanics of Solids	45	--	30	45	120	4
A7307	Metallurgy and Material Science	30	--	30	30	90	3
A7308	Thermodynamics	45	--	--	45	90	3
A7018	Universal Human Values 2: Understanding Harmony	30	15	--	45	90	3
A7023	Engineering Design Thinking	--	--	30	--	30	1
A7015	Quantitative Aptitude	15	--	--	15	30	1
A7031	Gender Sensitization	30	--	--	--	30	0
II Year II Semester							
A7019	Managerial Economics and Financial Analysis	45	--	--	45	90	3
A7309	Kinematics of Machinery	45	--	--	45	90	3
A7310	Internal Combustion Engines	45	--	30	45	120	4
A7311	Fluid Mechanics and Hydraulic Machines	45	--	30	45	120	4
A7312	Manufacturing Processes	45	--	30	45	120	4
A7313	Machine Drawing	--	--	60	--	60	2
A7024	Product Realization	--	--	30	--	30	1
A7014	Analytical Reasoning	15	--	--	15	30	1
A7032	Environmental Science	30	--	--	--	30	0
III Year I Semester							
A7314	Dynamics of Machinery	45	--	30	45	120	4
A7315	Metrology and Machine Tools	30	--	30	30	90	3
A7316	Machine Design - I	45	--	--	45	90	3
A7317	Applied Thermodynamics	45	--	--	45	90	3
A7351	Automobile Engineering (PE-I)	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A7282	Solar Energy and Applications(OE-I)	45	--	--	45	90	3
A7020	Professional Communication Skills	--	--	30	--	30	1
A7041	Internship-I	--	--	--	--	60	2
A7033	Indian Constitution	30	--	--	--	30	0
III Year II Semester							
A7318	Heat and Mass Transfer	45	--	30	45	120	4
A7319	Finite Element Method	45	--	30	45	120	4
A7320	Machine Design-II	45	--	--	45	90	3
A7357	Operations Research(PE-II)	45	--	--	45	90	3
A7361	Unconventional Machining Processes (PE-III)	45	--	--	45	90	3
A7086	Management Science (OE-II)	45	--	--	45	90	3
A7042	Mini Project	--	--	60	--	60	2
A7034	Essence of Indian Traditional Knowledge	30	--	--	--	30	0
A7035	Research Methodology	30	--	--	--	30	0
IV Year I Semester							
A7321	CIM and Robotics	45	--	30	45	120	4
A7322	Industrial Management	45	--	--	45	90	3
A7365	Automation in Manufacturing (PE-IV)	45	--	--	45	90	3
A7369	Production Planning and Control (PE-V)	45	--	--	45	90	3
A7084	Entrepreneurship Development (OE-III)	45	--	--	45	90	3
A7043	Internship-II	--	--	--	60	60	2
A7044	Project Work Phase-I	--	--	60	--	60	2

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
IV Year II Semester							
A7371	Energy Conservation and Renewable Energy Resources (PE-VI)	45	--	--	45	90	3
A7182	Disaster Management (OE-IV)	45	--	--	45	90	3
A7045	Project Work Phase-II	--	--	240	--	240	8

Details of various courses presented in terms of teaching and learning scheme in VCE-R20

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
Regulation: VCE-R20							
I Year I Semester							
A6001	Linear Algebra and Ordinary Differential Equations	45	--	30	45	120	4
A6004	Engineering Physics	45	--	30	45	120	4
A6009	English for Communication	30	--	30	30	90	3
A6501	Problem Solving with Python	30	--	30	30	90	3
A6301	Engineering Graphics	15	--	60	15	90	3
A6302	Engineering Workshop	--	--	30	--	30	1
A6021	Social Innovation	--	--	30	--	30	1
I Year II Semester							
A6002	Numerical Methods and Calculus	45	--	30	45	120	4
A6007	Engineering Chemistry	45	--	30	45	120	4
A6010	Business English	15	--	30	15	60	2
A6502	Data Structures	45	--	30	45	120	4
A6303	Engineering Mechanics	45	--	30	45	120	4
A6022	Engineering Exploration	--	--	30	--	30	1
II Year I Semester							
A6012	Probability Distributions and Statistics	45	15	--	60	120	4
A6015	Universal Human Values 2: Understanding Harmony	30	15	--	45	90	3
A6206	Basic Electrical and Electronics Engineering	45	--	30	45	120	4

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A6304	Mechanics of Solids	45	--	30	45	120	4
A6305	Metallurgy and Material Science	30	--	30	30	90	3
A6306	Thermodynamics	30	--	--	30	60	2
A6023	Engineering Design Thinking	--	--	30	--	30	1
A6013	Quantitative Aptitude	15	--	--	15	30	1
A6031	Gender Sensitization	30	--	--	--	30	0
II Year II Semester							
A6016	Managerial Economics and Financial Analysis	45	--	--	45	90	3
A6307	Machine Drawing	15	--	60	15	90	3
A6308	I.C. Engines and Gas Turbines	45	--	30	45	120	4
A6309	Fluid Mechanics and Hydraulic Machines	45	--	30	45	120	4
A6310	Manufacturing Processes	45	--	30	45	120	4
A6311	Kinematics of Machinery	30	--	--	30	60	2
A6024	Product Realization	--	--	30	--	30	1
A6014	Analytical Reasoning	15	--	--	15	30	1
A6032	Environmental Science	30	--	--	--	30	0
III Year I Semester							
A6312	Dynamics of Machinery	45	--	30	40	120	4
A6313	Metrology and Machine Tools	30	--	30	30	90	3
A6314	Applied Thermodynamics	45	--	--	45	90	3
A6315	Design of Machine Elements	45	--	--	45	90	3
A6351	Automobile	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
	Engineering(PE-I)						
A6281	Introduction to Electric Vehicles (OE-I)	45	--	--	45	90	3
A6017	Professional Communication Skills	--	--	30	--	30	1
A6341	Internship-I	--	--	--	--	60	2
A6033	Indian Constitution	30	--	--	--	30	0
III Year II Semester							
A6316	Machine Design	45	--	--	45	90	3
A6317	Heat Transfer	45	--	30	45	120	4
A6318	Finite Element Method	45	--	30	45	120	4
A6358	Robotics (PE-II)	45	--	--	45	90	3
A6362	Operations Research (PE-III)	45	--	--	45	90	3
A6183	Disaster Management (OE-II)	45	--	--	45	90	3
A6342	Mini Project	--	--	60	--	60	2
A6034	Essence of Indian Traditional Knowledge	30	--	--	--	30	0
A6035	Research Methodology	30	--	--	--	30	0
IV Year I Semester							
A6319	CAD/CAM	45	--	30	40	120	4
A6320	Mechanical Vibrations	45	--	--	45	90	3
A6365	Additive Manufacturing (PE-IV)	45	--	--	45	90	3
A6369	Total Quality Management and Inventory Control (PE-V)	45	--	--	45	90	3
A6083	Management Science (OE-III)	45	--	--	45	90	3
A6343	Internship-II	--	--	--	--	60	2

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A6344	Project Work Phase-I	--	--	60	--	60	2
IV Year II Semester							
A6371	Power Plant Engineering (PE-VI)	45	--	--	45	90	3
A6084	Entrepreneurship Development (OE-IV)	45	--	--	45	90	3
A6345	Project Work Phase-II	--	--	240	--	240	8

Details of various courses presented in terms of teaching and learning scheme in VCE-R19

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
Regulation: VCE-R19							
I Year I Semester							
A5001	Linear algebra and Ordinary Differential Equations	45	--	30	45	120	4
A5003	Applied Physics	45	--	30	45	120	4
A5005	Communicative English	30	--	30	30	90	3
A5501	Python Programming	15	--	60	15	90	3
A5301	Engineering Graphics and Computer Aided Drafting	15	--	60	15	90	3
A5006	Social Innovation	--	--	30	--	30	1
I Year II Semester							
A5002	Advanced Calculus	45	15	30	60	150	5
A5004	Applied Chemistry	45	--	30	45	120	4
A5502	Data Structures	45	--	30	45	120	4
A5302	Engineering Mechanics	45	--	30	45	120	4
A5007	Engineering Exploration	--	--	30	--	30	1
A5008	Co-Engineering Laboratory	--	--	60	--	60	2
II Year I Semester							
A5015	Managerial Economics and Financial Analysis	45	--	--	45	90	3
A5205	Basic Electrical and Electronics Engineering	45	--	30	45	120	4
A5303	Mechanics of Solids	45	15	30	60	150	5
A5304	Thermodynamics	45	15	--	60	120	4
A5305	Metallurgy and Material Science	45	--	30	40	120	4
A5013	Verbal Ability and Logical Reasoning	15	--	--	15	30	1

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A5011	Gender Sensitization	30	--	--	--	30	0
II Year II Semester							
A5010	Probability and Statistics	45	--	--	45	90	3
A5306	I.C. Engines and Gas Turbines	45	--	30	45	120	4
A5307	Kinematics of Machinery	45	--	--	45	90	3
A5308	Fluid Mechanics and Hydraulic Machines	45	--	30	45	120	4
A5309	Manufacturing Processes	45	--	30	45	120	4
A5310	Machine Drawing	--	--	60	--	60	2
A5014	Quantitative Aptitude	15	--	--	15	30	1
A5012	Environmental Science	30	--	--	--	30	0
III Year I Semester							
A5311	Design of Machine Elements	45	15	--	60	120	4
A5312	Dynamics of Machinery	45	--	30	45	120	4
A5313	Applied Thermodynamics	45	15	--	60	120	4
A5314	Metrology and Machine Tools	45	--	30	45	120	4
A5352/ A5354	Automobile Engineering (PE-I)/ Operations Research (PE-I)	45	--	--	45	90	3
A5016	Engineering Design Thinking	--	--	30	--	30	1
A5315	Internship –I	--	--	60	--	60	2
A5018	Essence of Indian Traditional Knowledge	30	--	--	--	30	0
III Year II Semester							
A5316	Machine Design	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A5317	Heat Transfer	45	--	30	45	120	4
A5318	CAD/CAM	45	--	30	45	120	4
A5319	Numerical Simulation laboratory	--	--	60	--	60	2
A5131	Project Planning And Management (OE-I)	45	--	--	45	90	3
A5358	Energy Conservation And Renewable Energy Resources (PE-II)	45	--	--	45	90	3
A5017	Product Realization	--	--	30	--	30	1
A5320	Mini Project	--	--	60	--	60	2
A5019	Indian Constitution	30	--	--	--	30	0
IV Year I Semester							
A5321	Finite Element Methods	45	--	30	45	120	4
A5322	Robotics	45	--	--	45	90	3
A5232/ A5132	Solar Energy And Applications (OE-II)/ Air Pollution And Control (OE-II)	45	--	--	45	90	3
A5360/ A5362	Automation in Manufacturing(PE-III)/ Power Plant Engineering(PE-III)	45	--	--	45	90	3
A5323	Project Work Phase –I	--	--	120	--	120	4
A5324	Internship –II	--	--	60	--	60	2
IV Year II Semester							
A5020	Management Science	45	--	--	45	90	3
A5133/ A5034	Disaster Management (OE-III)/ Entrepreneurship Development(OE-III)	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A5364	Total Quality Management(PE-IV)	45	--	--	45	90	3
A5325	Project Work Phase -II	--	--	240	--	240	8

Details of various courses presented in terms of teaching and learning scheme in VCE-R18

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
Regulation: VCE-R18							
I Year I Semester							
A4001	Linear Algebra and Ordinary Differential Equations	45	15	--	60	120	4
A4005	Oscillations, Waves and Optics	60	--	--	60	120	4
A4501	Programming for Problem Solving	45	15	--	60	120	4
A4301	Engineering Graphics and Computer Aided Drafting	--	--	45	--	45	1.5
A4006	Oscillations, Waves and Optics Laboratory	--	--	30	--	30	1
A4502	Programming for Problem Solving Laboratory	--	--	45	--	45	1.5
A4021	Social Innovation	--	--	30	--	30	1
I Year II Semester							
A4002	Advanced Calculus	45	15	--	60	120	4
A4007	Engineering Chemistry	60	--	--	60	120	4
A4303	Engineering Mechanics	45	15	--	60	120	4
A4009	Functional English	45	--	--	45	90	3
A4302	Engineering Workshop	--	--	45	--	45	1.5
A4008	Engineering Chemistry Laboratory	--	--	30	--	30	1
A4304	Engineering Mechanics Laboratory	--	--	45	--	45	1.5
A4010	English Language Communication Skills Laboratory	--	--	30	--	30	1
A4022	Engineering Exploration	--	--	30	--	30	1
II Year I Semester							
A4025	Managerial Economics and Financial Analysis	45	--	--	42	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A4206	Basic Electrical and Electronics Engineering	45	--	30	40	120	4
A4305	Mechanics of Solids	45	15	30	60	150	5
A4306	Thermodynamics	45	15	--	60	120	4
A4307	Metallurgy and Material Science	45	--	30	40	120	4
A4019	Verbal Ability and Logical Reasoning	15	--	--	15	30	1
A4013	Gender Sensitization	30	--	--	--	30	0
II Year II Semester							
A4012	Probability and Statistics	45	--	--	45	90	3
A4308	I.C. Engines and Gas Turbines	45	--	30	45	120	4
A4309	Kinematics of Machinery	45	--	--	45	90	3
A4310	Fluid Mechanics and Hydraulic Machines	45	--	30	45	120	4
A4311	Manufacturing Processes	45	--	30	45	120	4
A4312	Machine Drawing	--	--	60	--	60	2
A4017	Quantitative Aptitude	15	--	--	15	30	1
A4014	Environmental Science	30	--	--	--	30	0
III Year I Semester							
A4313	Dynamics of Machinery	45	--	30	45	120	4
A4314	Metrology and Machine Tools	45	--	30	45	120	4
A4315	Design of Machine Elements	45	15	--	60	120	4
A4316	Applied Thermodynamics	45	15	--	60	120	4
A4351/ A4352	Additive Manufacturing (PE-I)/ Automobile Engineering (PE-I)	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
A4317	Internship-I	--	--	60	--	60	2
A4018	Engineering Design Thinking	--	--	30	--	30	1
A4015	Essence of Indian Traditional Knowledge	30	--	--	--	30	0
III Year II Semester							
A4318	Machine Design	45	15	--	60	120	4
A4319	Heat Transfer	45	--	30	45	120	4
A4320	CAD/CAM	45	15	30	60	150	5
A4531/ A4131/ A4431	Fundamentals of Java(OE-I)/ Project Planning And Management (OE-I)/ Fundamentals of IoT (OE-I)	45	--	--	45	90	3
A4354/ A4356	Composite Materials (PE-II)/ Tribology (PE-II)	45	--	--	45	90	3
A4020	Product Realization	--	--	30	--	30	1
A4321	Mini Project	--	--	60	--	60	2
A4016	Indian Constitution	30	--	--	--	30	0
IV Year I Semester							
A4322	Finite Element Methods	45	--	30	45	120	4
A4323	Robotics	45	--	--	45	90	3
A4532/ A4036	Operations Research (OE-II)/ Logistics And Supply Chain Management	45	--	--	45	90	3

Course Code	Course Titles	Teaching & Learning Scheme					
		Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester	Total Credits (C)* (Total Hours/30)
		L	T	P	SL		
	(OE-II)						
A4357/ A4358	Automation in Manufacturing(PE-III)/ Power Plant Engineering(PE-III)	45	--	--	45	90	3
A4325	Internship-II	--	--	60	--	60	2
A4324	Project Work Phase-I	--	--	120	--	120	4
IV Year II Semester							
A4026	Management Science	45	--	--	45	90	3
A4133/ A4034	Disaster Management (OE-III)/ Entrepreneurship Development (OE-III)	45	--	--	45	90	3
A4360	Total Quality Management(PE-IV)	45	--	--	45	90	3
A4326	Project Work Phase-II	--	--	240	--	240	8

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