SHRI VENKATESHWARA UNIVERSITY

Syllabus

B.TECH
Mechanical Engineering
VIIIth SEMESTER

(Four Years Degree Programme)

(w.e.f. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

Mechanical Engineering

SEMESTER-VIII

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	SME-801	Automobile Engineering	3	0	0	20	10	30		70		100	3
2	SME-802	Total Quality Management	3	0	0	20	10	30		70		100	3
3	SOE-081	Renewable Energy	3	0	0	20	10	30		70		100	3
4	SOE-082	Operation Research	3	0	0	20	10	30		70		100	3
5	SME-811	Project-IV	0	0	12				100		100	200	6
6	SME-888	Seminar							100			100	3
		Total										700	21

Course Code	**SME-801**
Course Title	**Automobile Engineering**
Number of Credits	**3 (3L:0T:0P)**

Objectives:
To understand the construction and working principle of various parts of an automobile

Contents:
Types of automobiles, vehicle construction and layouts, chassis, frame and body, vehicle aerodynamics, IC engines-components, function and materials, variable valve timing (VVT). Engine auxiliary systems, electronic injection for SI and CI engines, unit injector system, rotary distributor type and common rail direct injection system, transistor based coil ignition & capacitive discharge ignition systems, turbo chargers (WGT, VGT), engine emission control by 3-way catalytic converter system, Emission norms (Euro & BS).

Transmission systems, clutch types & construction, gear boxes- manual and automatic gear shift mechanisms, Over drive, transfer box, flywheel, torque converter, propeller shaft, slip joints, universal joints, differential and rear axle, Hotchkiss drive and Torque tube drive.

Steering geometry and types of steering gear box, power steering, types of front axle, types of suspension systems, pneumatic and hydraulic braking systems, antilock braking system (ABS), electronic brake force distribution (EBD) and traction control.

Alternative energy sources, natural gas, LPG, biodiesel, bio-ethanol, gasohol and hydrogen fuels in automobiles, modifications needed, performance, combustion & emission characteristics of alternative fuels in SI and CI engines, Electric and Hybrid vehicles, application of Fuel Cells

Course Outcomes:
Upon completion of this course, students will understand the function of each automobile component and also have a clear idea about the overall vehicle performance.

Text books:
1. Kirpal Singh, Automobile Engineering, 7th ed., Standard Publishers, New Delhi, 1997.
2. Jain K.K. and Asthana R.B., Automobile Engineering, Tata McGraw Hill, New Delhi, 2002.
3. Heitner J., Automotive Mechanics, 2nd ed., East-West Press, 1999.
4. Heisler H., Advanced Engine Technology, SAE International Publ., USA, 1998.

Course Code	**SME-802**
Course Title	**Total Quality Management**
Number of Credits	**3 (3L:0T:0P)**

Objectives:
To facilitate the understanding of total quality management principles and processes

Contents:
Introduction, need for quality, evolution of quality; Definitions of quality, product quality and service quality; Basic concepts of TQM, TQM framework, contributions of Deming, Juran and Crosby. Barriers to TQM; Quality statements, customer focus, customer orientation & satisfaction, customer complaints, customer retention; costs to quality.

TQM principles; leadership, strategic quality planning; Quality councils- employee involvement, motivation; Empowerment; Team and Teamwork; Quality circles, recognition and reward, performance appraisal; Continuous process improvement; PDCE cycle, 5S, Kaizen; Supplier partnership, Partnering, Supplier rating & selection.

The seven traditional tools of quality; New management tools; Six sigma- concepts, methodology, applications to manufacturing, service sector including IT, Bench marking process; FMEA- stages, types. TQM tools and techniques, control charts, process capability, concepts of six sigma, Quality Function Development (QFD), Taguchi quality loss function; TPM- concepts, improvement needs, performance measures.

Quality systems, need for ISO 9000, ISO 9001-9008; Quality system- elements, documentation,; Quality auditing, QS 9000, ISO 14000- concepts, requirements and benefits; TQM implementation in manufacturing and service sectors.

Course Outcomes:
Upon completion of this course, the students will be able to use the tools and techniques of TQM in manufacturing and service sectors.

Text Books:
1. Besterfield D.H. et al., Total qualityManagement, 3rd ed., Pearson Education Asia, 2006.
2. Evans J.R. and Lindsay W.M., The management and Control of Quality, 8th ed., first Indian edition, Cengage Learning, 2012.
3. Janakiraman B. and Gopal R.K., Total Quality Management, Prentice Hall India, 2006.
4. Suganthi L. and Samuel A., Total Quality Management, Prentice Hall India, 2006.

Course Code	**SOE-081**
Course Title	**Renewable Energy**
Number of Credits	**3 (3L:0T:0P)**

Objectives: To impart the knowledge of basics of different non conventional types of power generation & power plants in detail so that it helps them in understanding the need and role of Non-Conventional Energy sources particularly when the conventional sources are scarce in nature.

Contents:

Introduction Various non -conventional energy resources - Introduction, availability, classification, relative merits and demerits. Solar Cells: Theory of solar cells. solar cell materials, solar cell array, solar cell power plant, limitations.

Solar radiation, flat plate collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations.
Resources of geothermal energy, thermodynamics of geo -thermal energy conversion -electrical conversion, non -electrical conversion, environmental considerations. 4 Magneto -hydrodynamics (MHD): Principle of working of MHD Power plant, performance and limitations. 2 Fuel Cells: Principle of working of various types of fuel cells and their working, performance and limitations.

Principle of working, performance and limitations. Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. performance and limitations of energy conversion systems.

Availability of bio -mass and its conversion theory. Ocean Thermal Energy Conversion (OTEC): Availability, theory and working principle, performance and limitations. Wave and Tidal Wave: Principle of working, performance and limitations. Waste Recycling Plants.

Course Outcomes:

At the end of the course the students will be able to:

1. Study various non-conventional sources of energy like wind, biomass etc and its applications in remote areas of the country.
2. Understand the working criteria of various direct energy conversion systems and study its applications.
3. Understand the importance of non energy scenario.
4. Understand and pursue further research work behind the development of non conventional energy sources as a part of their research work.
5. Understand other direct energy conversion systems like m thermoelectric and fuel cells.
6. Evaluate methods for generation of hydrogen power and production of hydrogen.

Text/References Books:

1. Raja etal, “Introduction to Non -Conventional Energy Resources” Scitech Publications.
2. John Twideu and Tony Weir, “Renewal Energy Resources” BSP Publications, 2006.
3. M.V.R. Koteswara Rao, “ Energy Resources: Conventional & Non -Conventional “ BSP Publications,2006.
4. D.S. Chauhan,”Non -conventional Energy Resources” New Age International.

Course Code	**SOE-082**
Course Title	**Operation Research**
Number of Credits	**3 (3L:0T:0P)**

Contents:

Introduction: Definition and scope of operations research (OR), OR model, solving the OR model, art of modeling, phases of OR study. Linear Programming: Two variable Linear Programming model and Graphical method of solution, Simplex method, Dual Simplex method, special cases of Linear Programming, duality, sensitivity analysis.

Transportation Problems: Types of transportation problems, mathematical models , transportation algorithms, Assignment: Allocation and assignment problems and models, processing of job through machines.

Network Techniques: Shortest path model, minimum spanning Tree Problem, Max -Flow problem and Min -cost problem. Project Management: Phases of project management, guidelines for network construction, CPM and PERT.

Theory of Games : Rectangular games, Minimax theorem, graphical solution of 2 x n or m x 2 games, game with mixed strategies, reduction to linear programming model. Quality Systems: Elements of Queuing model, generalized poisson queuing model, single server models.

Inventory Control: Models of inventory, operation of inventory system, quantity discount. Replacement: Replacement models: Equipment's that deteriorate with time, equipment's that fail with time.

Reference Books:

1. Wayne L. Winston, "Operations Research" Thomson Learning,2003.
2. Hamdy H. Taha, "Operations Research-An Introduction" Pearson Education,2003.
3. R. Panneer Seevam, "Operations Research" PHI Learning, 2008.
4. V.K.Khanna, "Total Quality Management" New Age International, 2008.