

SHRI VENKATESHWARA UNIVERSITY



Syllabus

B.TECH
Mechanical Engineering
VIIth SEMESTER
(Four Years Degree Programme)

(w.e.f. 2019-20)

**SCHOOL OF ENGINEERING &
TECHNOLOGY**

Mechanical Engineering SEMESTER-VII

Sl. No	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	SME-701	Automation in Manufacturing	3	0	0	20	10	30		70		100	3
3	SME-702	Refrigeration and Air Conditioning	3	0	0	20	10	30		70		100	3
4	SME-703	Power Plant Engineering	3	1	0	20	10	30		70		100	4
5	SOE-071	Introduction to Industrial Management	3	0	0	20	10	30		70		100	3
6	SME-711	Mechanical Engineering Lab III (Manufacturing)	0	0	4				25		25	50	2
7	SME-712	Project-III	0	0	6				50		50	100	4
8	SME - 777	Summer Internship							100			100	3
		Total										650	22

Summer Internship after IV sem

Course Code	SME-701
Course Title	Automation in Manufacturing
Number of Credits	3 (3L:0T:0P)

Objectives:

1. To understand the importance of automation in the of field machine tool based manufacturing
2. To get the knowledge of various elements of manufacturing automation – CAD/CAM, sensors, pneumatics, hydraulics and CNC
3. To understand the basics of product design and the role of manufacturing automation

Course Contents:

Introduction: Why automation, Current trends, CAD, CAM, CIM; Rigid automation: Part handling, Machine tools. Flexible automation: Computer control of Machine Tools and Machining Centers, NC and NC part programming, CNC-Adaptive Control, Automated Material handling. Assembly, Flexible fixturing.

Computer Aided Design: Fundamentals of CAD - Hardware in CAD-Computer Graphics Software and Data Base, Geometric modeling for downstream applications and analysis methods; Computer Aided Manufacturing: CNC technology, PLC, Micro-controllers, CNC-Adaptive Control

Low cost automation: Mechanical & Electro mechanical Systems, Pneumatics and Hydraulics, Illustrative Examples and case studies

Introduction to Modeling and Simulation: Product design, process route modeling, Optimization techniques, Case studies & industrial applications.

Course Outcomes:

Upon completion of this course, the students will get a comprehensive picture of computer based automation of manufacturing operations

Text Books:

- (i) Mikell P. Groover, Automation, Production Systems, and Computer-integrated Manufacturing, prentice Hall
- (ii) SeropeKalpakjian and Steven R. Schmid, Manufacturing – Engineering and Technology, 7th edition, Pearson
- (iii) YoramKoren, Computer control of manufacturing system, 1st edition
- (iv) Ibrahim Zeid , CAD/CAM : Theory & Practice, 2nd edition.

Course Code	SME-702
Course Title	Refrigeration and Air Conditioning
Number of Credits	3 (3L:0T:0P)

Objectives:

1. To familiarize with the terminology associated with refrigeration systems and air conditioning
2. To understand basic refrigeration processes
3. To understand the basics of psychrometry and practice of applied psychrometrics
4. To acquire the skills required to model, analyse and design different refrigeration as well as air conditioning processes and components

Course Content:

Classification of refrigeration systems

Advanced vapour compression cycles, Refrigerants and their mixtures: properties and characteristics
 -Ozone depletion and global warming issues-System components: Compressors, Condensers, Expansion devices and Evaporators-Performance matching of components of refrigeration systems

Advanced sorption refrigeration systems and their components.

Review of Psychrometry and Air-conditioning processes-Comfort air conditioning and Cooling load calculations - Applications of AC systems - Concept of enthalpy potential - Air washers, Cooling towers, Evaporative condensers, Cooling and dehumidifying coils.

Course Outcomes:

A student who has done the course will have a good understanding of the working principles of refrigeration and air-conditioning systems.

Text Books:

1. Gosney, W.B, Principles of Refrigeration, Cambridge University Press, 1982.
2. Stoecker, W.F. and Jones, J.W., Refrigeration and Air conditioning, Tata McGraw Hill, 1986.
3. Arora, C.P., Refrigeration and Air conditioning, Tata McGraw Hill, 2nd Edition, 2000.
4. Kuehn, T.H., Ramsey, J.W. and Threlkeld, J.L., Thermal Environmental Engineering, 3rd Edition, Prentice Hall, 1998.

Course Code	SME-703
Course Title	Power Plant Engineering
Number of Credits	4 (3L:1T:0P)

Objectives:

To provide an overview of power plants and the associated energy conversion issues

Contents:

Coal based thermal power plants, basic Rankine cycle and its modifications, layout of modern coal power plant, super critical boilers, FBC boilers, turbines, condensers, steam and heating rates, subsystems of thermal power plants, fuel and ash handling, draught system, feed water treatment, binary cycles and cogeneration systems

Gas turbine and combined cycle power plants, Brayton cycle analysis and optimization, components of gas turbine power plants, combined cycle power plants, Integrated Gasifier based Combined Cycle (IGCC) systems.

Basics of nuclear energy conversion, Layout and subsystems of nuclear power plants, Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANDU Reactor, Pressurized Heavy Water Reactor (PHWR), Fast Breeder Reactors (FBR), gas cooled and liquid metal cooled reactors, safety measures for nuclear power plants.

Hydroelectric power plants, classification, typical layout and components, principles of wind, tidal, solar PV and solar thermal, geothermal, biogas and fuel cell power systems Energy, economic and environmental issues, power tariffs, load distribution parameters, load curve, capital and operating cost of different power plants, pollution control technologies including waste disposal options for coal and nuclear plants.

Course Outcomes:

Upon completion of the course, the students can understand the principles of operation for different power plants and their economics.

Text Books:

1. Nag P.K., Power Plant Engineering, 3rd ed., Tata McGraw Hill, 2008.
2. El Wakil M.M., Power Plant Technology, Tata McGraw Hill, 2010.
3. Elliot T.C., Chen K and Swanekamp R.C., Power Plant Engineering, 2nd ed., McGraw Hill, 1998.

Course Code	SOE-071
Course Title	Introduction to Industrial Management
Number of Credits	3 (3L:0T:0P)

Introduction : Concept, Development, application and scope of Industrial Management. **Productivity :** Definition, measurement, productivity index, types of production system, Industrial Ownership.

Management Function : Principles of Management- Management Tools – time and motion study, work simplification- process charts and flow diagrams, Production Planning, Specification of Production requirements.

Inventory control : Inventory, cost, Deterministic models, Introduction to supply chain management.

Quality control : Meaning, process control, SQC control charts, single, double and sequential sampling, Introduction to TQM.

Environmental Issues : Environmental Pollution – various management techniques to control Environmental pollution – Various control acts for Air, Water, Solid waste and Noise pollution. **Reference**

Books

1. Khanna O.P. : Industrial Engineering
2. T.R. Banga : Industrial Engineering and Management
3. Sharma B.R. : Environmental and Pollution Awareness.

Course Code	SME-711
Course Title	Mechanical Engineering Lab III (Manufacturing)
Number of Credits	2 (0L:0T:4P)

Objectives:

1. To provide an understanding of advanced manufacturing methods.
2. To get an idea of the dimensional & form accuracy of products

Contents :

About 12 experiments will be carried out as listed below.

1. Taper turning and external thread cutting using lathe
2. Contour milling using vertical milling machine
3. Spur gear cutting in milling machine
4. Measurement of cutting forces in Milling/ Turning process
5. CNC part programming
6. Drilling of a small hole using wire EDM
7. Microprocessor controlled pick & place robot
8. Use of Tool Maker's Microscope
9. Comparator and sine bar
10. Surface finish measurement equipment
11. Bore diameter measurement using micrometer and telescopic gauge
12. Use of Autocollimator

Course Outcomes:

Upon completion of this course, students will be able to perform some advanced manufacturing operations and also be able to evaluate the accuracy & tolerance of components produced.

Course Code	SME-712
Course Title	Project-III
Number of Credits	2 (0L:0T:4P)

Objectives:

It is intended to start the project work early in the seventh semester and carry out both design and fabrication of a mechanical device whose working can be demonstrated. The design is expected to be completed in the seventh semester and the fabrication and demonstration will be carried out in the eighth semester.