# SHRI VENKATESHWARA UNIVERSITY


## Syllabus

## M. TECH
## Thermal Engineering
## (Part -Time)
## I Semester

## (w.e.f. 2019-20)

# SCHOOL OF ENGINEERING & TECHNOLOGY

| Sl. No. | Subject Codes | Subject | Periods | | | Evaluation Scheme | | | | End Semester | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CT | TA | Total | PS | TE | PE | Total | Credit |
| 1 | WTE-101 | Thermodynamics and Combustion | 3 | 1 | 0 | 20 | 10 | 30 | | 70 | | 100 | 4 |
| 2 | WTE-012 | Energy Conservation and Management. | 3 | 0 | 0 | 20 | 10 | 30 | | 70 | | 100 | 3 |
| 3 | WTE-111 | Thermodynamics and Combustion Lab | 0 | 0 | 4 | | | | 25 | | 25 | 50 | 2 |
| 4 | AUD-101 | English for Research Paper Writing | 2 | 0 | 0 | | | | | | | | 0 |
| | | **Total** | | | | | | | | | | **250** | **9** |

WTE-101 Thermodynamics and Combustion

**Course Outcomes:**

At the end of the course:

udent will get Knowledge of exergy, basic laws governing energy conversion in multi- component systems and application of chemical thermodynamics.

Student will be aware about advanced concepts in thermodynamics with emphasis on thermodynamic relations, equilibrium and stability of multiphase multi-component systems.

3. Student will be aware about the molecular basis of thermodynamics.
4. To present theoretical, semi-theoretical and empirical models for the prediction of thermodynamic properties.
5. Student will be acquire the confidence in analyze the motion of combusting and non- combusting fluids whilst accounting for variable specific heats, non-ideal gas properties, chemical non-equilibrium and compressibility
6. Student should apply the fundamental principles of thermodynamics to non-ideal models of numerous engineering devices

Student can use a systems approach to simplify a complex problem

**Syllabus Contents:** **L T P**
3 -0 -0

**Unit 1**

First law and State postulates, Second law and Entropy, Availability and Irreversibility, Transient flow analysis

**Unit 2**

Nonreactive Ideal-Gas Mixture, PvT Behavior of Real gases and Real Gas mixture

**Unit 3**

Generalized Thermodynamic Relationship

**Unit 4**

Combustion and Thermo-chemistry, Second law analysis of reacting mixture, Availability analysis of reacting mixture,Chemical equilibrium

**Unit 5**

Statistical thermodynamics, statistical interpretations of first and second law and Entropy, Third law of thermodynamics, Nerst heat theorem.

**References:**


1. Cengel, “Thermodynamics”, Tata McGraw Hill Co., New Delhi, 1980.
2. Howell and Dedcius, “Fundamentals of Engineering Thermodynamics”, McGraw Hill Inc., U.S.A.
3. Van Wylen & Sonntag, “Thermodynamics”, John Wiley and Sons Inc., U.S.A.
4. Jones and Hawkings, “Engineering Thermodynamics”, John Wiley and Sons Inc., U.S.A, 2004.
5. Holman, “Thermodynamics”, McGraw Hill Inc., New York, 2002.
6. Faires V.M. and Simmag, “Thermodynamics”, Macmillan Publishing Co. Inc., U.S.A.
7. Rao Y.V.C., “Postulational and Statistical Thermodynamics”, Allied Publishers Inc,1994.

**WTE-012 Energy Conservation and Management**

**Course Outcomes:**

At the end of the course:

1. The student should acquire insight about the importance of energy
2. The student should capable to analyze all scenarios from energy consumption
3. The student should generate scenarios of energy consumption and predict the futuretrend The student should Suggest and plan energy conservation solutions

**Syllabus Contents:** **L T P**

3 - -

**Unit 1**

The energy market, energy scenario, planning, utilization pattern and future strategy, Importance of energy management.

**Unit 2**

Energy auditing- methodology and analysis,

**Unit 3**

Energy economics,

**Unit 4**

Energy conservation in industries, Cogeneration, Combined heating and power systems,

**Unit 5**

Relevant international standards and laws.

**References:**


1. L.C. Witte, P.S. Schmidt, D.R.Brown, “Industrial Energy Management and Utilization”, Hemispherical Publication, 1988.
2. Callaghan “Energy Conservation”.
3. D.A. Reeg, “Industrial Energy Conservation”, Pergamon Press, 1980.
4. T.L. Boyen, “Thermal Energy Recovery” Wiley, 1980.
5. L.J. Nagrath, “Systems Modeling and Analysis”, Tata McGraw Hill,1982.
6. W.C. Turner, “Energy Management Handbook “, Wiley, New York, 1982.
7. I.G.C. Dryden, “The Efficient Use of Energy “, Butterworth, London, 1982.
8. R. Loftnen, Van Nostrarid Reinhold C. “Energy Handbook”, 1978.
9. TERI Publications.