Course Number and Name
BME302 – THERMODYNAMICS
Credits and Contact Hours
4&60
Course Coordinator's Name
Mr.S.Manavalan
Text Books and References

TEXT BOOKS:

1. P.K.Nag-Basic and Applied Thermodynamics-Tata McGraw Hill Publishing Company, 2002
2. R.K.Rajput-Engineering Thermodynamics-Laxmi Publications

REFERENCES:

1. S.C.Somasundaram-Thermal Engineering-New Age International (P) Ltd,1996

2. Y.V.C.Rao-An Introduction to Thermodynamics-New Age International (P) Ltd, 2004

3. Yunus A.Cengel-Thermodynamics-International Edition, 2006

4.bookboon.com/en/engineering-**thermodynamics-ebook**

Course Description
To achieve an understanding of principles of thermodynamics and to be able to use it in accounting for the bulk behavior of the simple physical systems.

Prerequisites	Co-requisites
MATHEMATICS –I &II	Nil
required, elective, or selected elective (as per Table 5-1)	
Required	

Course Outcomes (COs)	
CO1	Solve first law thermodynamics based types of problems.
CO2	Solve second law thermodynamics based types of problems.
CO3	Understand Thermodynamic properties of pure substances
CO4	understand Thermodynamic relations & gas laws
CO5	Extend the ideas in implementation of mini/major project
CO6	Understand combustion of fuels

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	H	H			H		L	H		M	M
CO2						H		L			M	
CO3						H		L			M	M
CO4						H		L			M	M
CO5						H		L			M	M

CO6						H		L			M	

List of Topics Covered

UNIT-I BASIC CONCEPTS AND FIRST LAW OF THERMODYNAMICS 12

Concept of continuum, Thermodynamic systems-closed, open and control volume, Thermodynamic properties, path, point functions, process - Quasistatic processes, cycle, work, modes of work, heat, temperature, Zeroth law of thermodynamics, First law of Thermodynamics-applications to open and closed systems, internal energy, Specific heats Cp, Cv, enthalpy,steady and unsteady flow conditions.

UNIT-II SECOND LAW OF THERMODYNAMICS 12

Kelvin's and Clausius statements, Reversibility, Applications - Carnot cycle, Reversed Carnot cycle, heat engines,Refrigerators, heat pumps, Concept of Entropy, Clausius Inequality, Principle of increase of entropy, Carnot theorem, Entropy and irreversibility, Available energy, Availability,Gibbs and Helmholtz functions

UNIT III THERMODYNAMIC PROPERTIES OF PURE SUBSTANCES 12

Thermodynamic Properties Of Pure Substances in solid, liquid and vapour phases, P-V, P-T,T-V,T-S,H-S diagrams, PVT surfaces, steam table of thermodynamic properties, Calculations of properties, Work done and heat transferred in non flow and flow processes.

UNIT IV THERMODYNAMIC RELATIONS & GAS LAWS 12

Exact differential,Tds relations, Maxwell, Clausius-Clapeyron equation, Joule Thomson Co-efficient, Avagadro's Law, Vanderwaal's equation of state, mole concept, molar volume, equivalent weight, properties of mixture, Dalton's law of partial pressure, Amagat law, Enthalpy and specific heat, Molecular weight of gas mixture.

UNIT V COMBUSTION OF FUELS 12

Heating value of fuels, Combustion equations, Theoretical and excess air, Air-fuel ratio, Exhaust gas analysis, adiabatic flame temperature.