

Revised Syllabus (Effective from the session 2019-20)  
Gurukula Kangri Vishwavidyalaya, Haridwar  
Faculty of Engineering & Technology  
Computer Science & Engineering

**BME-C103**  
**BASIC MECHANICAL ENGINEERING**

MM: 100  
Time: 3 hrs  
L T P  
3 1 0

Sessional: 30  
ESE: 70  
Credits 4

**NOTE:** The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain 10 objective type questions of one mark each and student shall be required to attempt all questions. Sec.-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec.-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

**UNIT I**

**Thermodynamics I:** Introduction to SI units, Definition of thermodynamic system, Surrounding and Universe, Quasi static process, Energy interaction Zeroth law, Concept of temperature First law of thermodynamics, Application to closed and open system, Concept of Enthalpy, steady flow energy equation, Throttling process.

**UNIT II**

**Thermodynamics II:** Second law, reversible and irreversible process, Thermal reservoir, heat engines and thermal efficiency, COP of heat pump and refrigerator, Carnot cycle, Clausius inequality, Concept of entropy, Entropy change for ideal gases.

**UNIT III**

**Thermodynamics III:** Generation of steam at constant pressure, Properties of steam, Use of property diagram, Process of vapor in closed and open system, Rankine cycle. Stroke clearance ratio, Compression ratio, Definition and calculation of mean effective pressure (no proof) for air standard cycles (Otto and diesel cycles)

**UNIT IV**

**Mechanics:** Trusses: Plane structure, (Method of Joints and Sections only) Beams: Bending moment and shear force diagram for statically determinate beams.

**UNIT V**

**Strength of Materials:** Simple stresses and strain, strain energy, stress- strain diagram, elastic constants. Compound stress and strain: state of stress at a point, Simple tension, pure shear, general two-dimensional stress system, principal planes, principal stresses and strains, Mohr's stress circle, Poisson's ratio, maximum shear stress

**Text Books / References**

- 1 Kumar DS (2/e), Thermal Science and Engineering, S.K.Kataria, New Delhi, 2001
- 2 P.K.Nag (2/e), Engineering Thermodynamics, TMH, New Delhi, 2001
- 3 R.Yadav(7/e), Thermal Engineering, Central Publishing House, Allahabad, 2000
- 4 Shames Irving H.(4/e), Engineering Mechanics, PHI, New Delhi, 1994
- 5 Hibler (1/e), Statics and Dynamics, Pearson Education, Singapore, 2000