B.Tech Mechanical Engineering (AKU Syllabus) SEMESTER- VI

INDUSTRIAL ECONOMICS & ACCOUNTING Credit : 4

1. Various definitions of Economics : Nature of Economic Problem, Relation between science, Engineering. Technology & Economics **Lecture : 3**

2. Meaning of demand, Law of Demand, Elasticity of demand, Practical importance & application of the concept of elasticity of Demand **Lecture : 5**

3. Meaning of Production and factor of Production : Land, labor, Capital ,Entrepreneur & Organization –their Characteristics law of variable Proportion .Return to Scale **Lecture : 5**

4. Cost Analysis : Various concept of cost, Cost function, Short & Long run cost. Concept of Revenue ,Break-
Even Analysis **Lecture : 5**

5. Meaning of Market : Type of market – Perfect completion, Monopoly ,Oligopoly ,Monopolistic competition ,Main feature of these market), Meaning of Supply and Law of Supply, R ole of Demand & Supply in price in prime determination imperfect t competition **Lecture : 7**

6. Engineering Economy :
(a) Simple and compound interest, Annuities, (b)Basic methods For making economy Studies - (i) Present
worth method, (ii) Future worth method (iii)I.R.R method (c) Comparison of alternative – (i) Present worth method, (ii\) Future Worth method (iii) I.R.R method. **Lecture : 7**

7. Accounting: Meaning Scope and Role of accounting , Accounting concept & Convention. Accounting as
information System. Recording of transaction in journal and Ledgers. Trial – Balance, Preparation of final Account. **Lecture : 9**

DESIGN OF MACHINE ELEMENTS Credit : 5

1. Introduction : Engineering material and their properties, Manufacturing consideration in machine design, factor of safety. **Lecture : 4**

2. Simple stresses in machine parts, torsional and bending stresses, dynamic loads, stress concentration. **Lecture : 4**

3. Design of riveted joints, welded joints, bolted joint, cotter joint, knuckle joint, pressure vessels and pipe joints. **Lecture : 12**

4. Design of keys, couplings, shafts levers, columns, studs, power screw, belt drive, pulley **Lecture : 14**

5. Springs, clutches and brakes. **Lecture : 8**

Practical : Minimum six design problems pertaining to theory paper syllabus.

HEAT AND MASS TRANSFER Credit : 5

1. Introduction : Basic concepts and modes of heat transfer. **Lec : 1**

2. Conduction : General three dimensional heat conduction equation; one dimensional steady heat conduction through composite plane walls; cylinders and spheres; critical radius of insulation. **Lecture : 6**

3. Extended surface : Heat transfer from extended surfaces of uniform cross section. **Lecture : 4**
4. unsteady heat conduction : one dimensional unsteady heat conduction, lumped system analysis; use of
Heisler chart, periodic changes of surface temperature. **Lecture : 6**
5. Convection : Free and forced convection, hydrodynamic and thermal boundary layer equation over flat plate, laminar boundary layer analysis, fully developed heat transfer through smooth pipes, relation between fluid friction and heat transfer forced convection correlations, laminar free convection on a vertical flat plate, empirical co-relations, application of dimensional analysis. **Lec : 10**
6. Heat exchange : Types, LMTD, effectiveness, NTU method, single and multipass. **Lecture : 5**
7. Radiation : Physical mechanism, radiation properties, black body radiation, grey body, kirchoff's law, Wien's
displacement law, view factor, radiation exchange between infinite planes, radiation shields. **Lecture : 6**
8. Mass transfer : Fick's law, analogy between heat and mass transfer, equimolal counter diffusion, isothermal
evaporation of water through stagnant air. **Lecture : 4**

NON CONVENTIONAL MANUFACTURING Credit : 4
1. Introduction : Limitation of conventional manufacturing processes, need of unconventional manufacturing
process and its classification. **Lecture : 2**
2. Unconventional machining process : Principle and working and applications of unconventional machining process such as electro – discharge machining, electrochemical machining, ultrasonic machining, abrasive jet machining etc. **Lecture : 12**
3. Unconventional welding process : Principle and working and applications of unconventional welding processes such as laser beam welding, electron beam welding, ultrasonic welding, plasma arc welding. **Lecture : 12**
4. Explosive welding, cladding etc. under water welding, metallising. **Lecture : 4**
5. Unconventional forming processes, principle, working and applications of high energy forming processes such as explosive forming, electromagnetic forming, electro-discharge forming, water hammer forming, explosive compaction etc. **Lecture : 12**

COMPETITIVE MANUFACTURING STRATEGIES Credit : 4
1. The competitive environment in the market : The WTO agreement and its effect on Indian Industries, Manufacturing as a competitive strategy, Competitive Advantages and Disadvantages. **Lecture : 6**
2. Product Variety : Modular Design, Design for manufacturability, Selection of manufacturing Technologies, Vendor Development, Vendor rating, Just in time manufacturing, Kanban system, and Agile Manufacturing. **Lecture : 8**

3. Reengineering : TQM, MRP, ERP and simulation as tools for competitive manufacturing, Intelligent Manufacturing. **Lecture : 8**
4. Selection of manufacturing systems for different manufacturing scenarios : Dedicated manufacturing system, Flexible manufacturing system (FMS), cellular manufacturing system (CMS), and Re-configurable manufacturing system (RMS); Elementary of DMS, FMS, CMS, and RMS. **Lecture : 14**
5. Concept : of CIM, FOF, Network based manufacturing, and E-Manufacturing. **Lecture : 5**

INSTRUMENTATION AND MEASUREMENT
1. Functional elements of a basic measuring system, configuration of a measuring system, Methods for
correction for interfering and modifying inputs. **Lecture : 6**
2. Static characteristics like accuracy, precision, error sensitivity etc. Dynamic characteristics terms, Concepts of mechanical loading, order of the systems, Response of zero, First and second order systems to step, ramp and sinusoidal inputs, transfer function method. **Lecture : 8**
3. Classification of errors and statistical analysis of experimental data. **Lecture : 4**
4. Description of various types of transduction principles, transducers based on variable resistance, variable induction, variable capacitance and piezo-electric effects, Displacement transducer. **Lecture : 10**
5. Microprocessor systems, codes, Binary mathematics, Logic circuits. **Lecture : 6**
6. Data acquisition systems, via-computers DAS hardware. **Lec : 4**
7. Techniques for signal analysis. Lecture : 4