

**UNIVERSITY POLYTECHNIC
B.I.T., MESRA, RANCHI**

Syllabus of Diploma in Engineering (Manufacturing Engineering) (Semester V)

**COURSE STRUCTURE
(W.E.F. 2011 Batch Students)
(Total Unit 7.0)**

Course Code	Theory	Unit	Course Code	Sessional	Unit
DME 5001	Metallurgy	1.0	DME 5002	Metallurgy Lab	0.5
DME 5003	Measurement & Metrology	1.0	DME 5004	Measurement & Metrology Lab.	0.5
DME 5005	Production Management II	1.0	DME 5012	Project	1.0
DME 5007	Theory of Machine	1.0			
DME 5009	Machine Design	1.0			
		5.0			2.0

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SUBJECT : Metallurgy

COURSE CODE : DME 5001

Module 1

Engg. & Industrial Materials, Classification & application, recent development in metallic materials. Miller indices, Unit Cell, Crystal Structure. 5

Module 2

A brief description of Iron making and steel making - principle, raw materials & processes. 9

Module 3

Binary Equilibrium diagram - Isomorphous, Eutectic and Peritectic diagram, iron-carbon diagram, effect of alloying elements on steels, tool steel. 7

Module 4

Heat treatment of steel, Isothermal decomposition of austenite diagram, continuous cooling curves, annealing, normalising, hardening & tempering, surface hardening and case hardening. 9

Module 5

Cast iron - Grey iron, white iron, malleable iron & nodular iron. 3

Module 6

Corrosion : Definition, principles of electro-chemical corrosion, factors affecting corrosion, method of protection against corrosion. 5

Module 7

Properties & application of non ferrous alloys - Al & Cu alloys 2

Books:

1. Elements of Metallurgy by D. Swaroop
2. Physical metallurgy by V. Raghvan
3. Metallurgy of Engrs by E. C. Rollason.

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SUBJECT : Measurement & Metrology

COURSE CODE : DME 5003

Module 1

INTRODUCTION : Classification & Types of measuring instruments, limits, fits & tolerances.
Micrometer : Working principle, Construction and parts of micrometer. 7

Module 2

VERNIER CALIPER & GAUGES : Construction and parts of vernier, Principle of vernier.
Classification & Description of gauges. 5

Module 3

TELESCOPE GAUGE & STRAIGHTNESS : Combination set, Universal bevel protractor,
Reading the vernier bevel protector, sine bar, taper parallels, Flatness and Squareness testing, by
straight edge method and autocollimeter method. 4

Module 4

MEASUREMENT: General measurement system, Sensor, Signal conditioner, Data display and
data output block, Calibration, traceability and standards, Common terms encountered in
measurement techniques, Transducer, Range and span, Response: time lag, linear, Response time
constant, Resolution, sensitivity, Precision and repeatability, Significant figures, Average value
or mean, root mean square value, Accuracy and Errors. 8

Module 5

MEASUREMENT OF TEMPERATURE : Glass thermometers, Thermocouples, Temperature
compensation, Calibration, Advantages and disadvantages, uses of thermocouples. Bimetals
Resistance thermometer, Thermistors, their advantages and disadvantages and field of use,
Pyrometers. 6

Module 6

MEASUREMENT OF LEVEL : Method of measurement, float indicator, displacement type,
pressure dependent, capacitance type, ultrasonic transducer, piezoelectric transducer. 4

Module 7

MEASUREMENT OF TORQUE, VIBRATION & HUMIDITY : Different types of dynamometers,
Principle of operation and field of use. Different types of pick ups and transducers, their principle of
operation & field of use. 6

Reference – Books :

1. Measurements – Harsh Vardhan
2. Electrical & Electronics and Instrument – A. K. Sawhney
3. Mechanical Measurement and Control – R. V. Jalgaonkar
4. Production Technology – O.P.Khanna & M. Lal

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SUBJECT : Production Management – II

COURSE CODE : DME 5005

Module 1

Book Keeping : Journal and Ledger entries, balance sheet, profit and loss statement. 4

Module 2

Cost and cost Analysis : cost structure, methods of allocating overhead cost, standard cost, fixed cost and variable cost. 4

Module 3

Engineering Economy : Break-even analysis point. Reason for replacement, Depreciation. 4

Module 4

Reliability : Definitions, basic concept. Failure patterns for complex product, designing for reliability, System reliability. 10

Module 5

Aggregate planning : Purpose, scope and techniques of aggregate planning . 6

Module 6

Group Technology : Concept, classification and coding of parts, coding system ,OPTIZ coding system and its application. 6

Module 7

Concept of JIT & Lean Manufacturing : Production wastages and its control. 6

Text-Books:

1. Industrial engineering and management of manufacturing system by Dr. S.Kumar
2. Industrial organization & Management system by O.P. Khanna

Reference – Books :

1. Modern production/Operation Management by Elwood.S.Buffa & Rakesh K. Sarin
2. Production & Operation Management by S.N. Chary
3. Industrial Engg. & Management by O. P. Khanna

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Subject : Theory of Machine

Course code : DME 5007

Module 1

Mechanism & Machine Link : motion of link, velocity of a point on a link, rubbing velocity at a pin joint, mechanical advantages. 7

Module 2

Acceleration in mechanism : Introduction, acceleration diagram for a link, acceleration of a point on a link. 6

Module 3

Belt Drive : Classification of belt and belt drive, material used for belt, velocity ratio slip and creep of belt, power transmitted by a belt. Driving tension, centrifugal tension, and maximum tension in the belt, condition for the maximum power. Advantages and disadvantages of Vee belt drive over flat belt drive. 6

Module 4

Gears : Classification of gears, terms used in gears, law of gearing, forms of teeth, length of path of contact, length of arc of contact, contact ratios, interference in involute gears, minimum no. of teeth on the pinion in order to avoid interference. 6

Module 5

Gear Trains : Simple and compound gear train. 5

Module 6

Cams : Introductions, classification of followers, classification of cams, motion of the followers, displacement, velocity and acceleration diagrams & cam profile. 5

Module 7

Balancing : Balancing of Rotating masses by a single mass in same plane, Balancing of a single rotating mass by two masses rotating in different planes, Balancing of several masses rotating in same plane. 5

BOOKS:

1. Theory of machine by R.S Khurmi & J.K Gupta
2. Theory of machine by Rattan
3. Theory of machine by PL Ballaney
4. Kinematic and dynamics machine by Amitava Ghosh

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Subject : Machine Design

Course code : DME 5009

Module 1

Basic Concept of Design Theory : Introduction to design, Design Consideration, Design procedure, Fatigue, creep, types of induced stresses, crushing and bearing stresses, stress concentration, selection of materials and manufacturing processes ,use of design data books, selection of material.

7

Module 2

Welded Joints : Types of Welded joints, Design of welded joints.

3

Module 3

Riveted joints : introduction, method of riveting , materials of rivets , manufacturing of rivets, types of rivets heads, failures of riveted joints, strength of riveted joints, efficiency of riveted joint.

5

Module 4

Cotter and knuckle joint : Introduction, types of cotter joint, design of simple cotter joint, & design of knuckle joint.

5

Module 5

Keys and couplings : Introduction, types of keys, design of keys, types of shaft coupling, design of muff, flange and flexible coupling.

5

Module 6

Shaft : Introduction, materials used for shaft, types of shaft, design of shaft subjected to torsion, and bending.

7

Module 7

Sliding and Contact Bearings : Hydrodynamic lubrications, bearing characteristic number, Sommerfield no., and bearing modulus, coefficient of friction. Heat generated in journal bearings, Rolling contact bearing, types , standard dimension and designation of ball bearings, bearing life.

8

BOOKS:

1. M/c Design by Sharma & Agarwal
2. Design of M/Cs by Abdulla Sheriff
3. Design of Machine Elements by Bhandari
4. Design of Machine Elements by Shieighley
5. Machine Design by R.S. Khurmi