

**Short Syllabi of the Courses for B. Tech. Degree in
Production Engineering
(2006 Admission)**

FIRST & SECOND SEMESTERS: Common for all branches

THIRD SEMESTER

MAU201: Mathematics III

3-0-0-3

Probability distributions, Random variables, mean and variance of probability distributions, Chebyshev's theorem, joint distributions, Sampling distributions and inference concerning means, sampling distribution of the variance, tests of hypothesis, Inference concerning variance, test for goodness of fit, regression analysis, analysis of variance, completely randomized designs.

Text Book:

1. Johnson R.A, Miller & Freund's Probability and Statistics for Engineers, 5thEdn., Prentice Hall Ltd., 1995

MEU202: Elements of Solid Mechanics

3-0-0-3

Prerequisite: ZZU101

Definition of stress and strain, stress in axially loaded members, generalized Hooke's laws, Bending stresses in beams, shear force and bending moment diagrams, torsion of circular elastic bars, Transformation of stress and strains for the plane problems, compound stresses, theory of columns.

Text Books:

1. Popov, E. P., Engineering Mechanics of Solids, Prentice Hall of India, New Delhi, Second Edn., 2000.

References:

1. Timoshenko, S.P. and Young, D.H., Elements of Strength of Materials, McGraw Hill.
2. Shames, Irving H., Introduction to Solid Mechanics, Prentice Hall of India, Second Edn.
3. Crandall, S.H., Dahl, N.C., and Lardner, T.J., Introduction to Mechanics of Solids, McGraw Hill.

MEV203: Materials Science and Metallurgy

3-0-0-3

Prerequisite: Nil

Introduction and overview of engineering materials, Atomic Structure and Bonding, Structure of Crystalline Solids, Imperfections/Defects in Solids, Diffusion in Solids, Mechanical Responses of Metals, Dislocations and Strengthening Mechanisms, Plastic deformation, Failure Mechanisms of Materials, Phases and Phase Diagrams, Phase Transformations, Metallic alloys, Structure and Properties of Ceramics, Structure and Properties of Polymers and Composites, Materials Selection and Design Principles.

Text Book:

1. Smith, Science of Engineering Materials, Prentice-Hall,

2. Srivastava C.M , Srinivasan C. Science of Engineering materials, 2/E, New Age, 2002
3. Callister W.D. , Materials Science and Engineering, John Wiley, 2005

References:

1. Avner S.H., Introduction to Physical Metallurgy, , 2/E, McGraw Hill, 2003
2. Van Vlack L.H., 'Elements of Material Science and Engineering', Pearson Edn., 2005
3. Shackelford J.F., Introduction to Material Science for Engineers, 6/E, Prentice Hall, 2004
4. Reed Hill, Physical Metallurgy Principles, Affiliated East West Press, 2004

EEG201: Electrical Measurements and Machines

3-0-0-3

Measurement of power, Basics of rotating machinery, principle of operation, e.m.f and torque equation, d.c. Machines, principles of operation, generators and motors, Transformers, Alternators, synchronous machines, single phase and special machines. Working of AC and DC Servomotors and Principles of Position, Velocity and Force servo control Systems- Applications in CNC Machine Tool drives and Robots.

Text Book:

1. Hughes, K., Electrical Technology, E.L.B.S., 1996
2. Nagrath, I.J., and Kothari, D.P., Electrical Machines, Tata McGraw Hill Ltd., New Delhi, 1997.

MEU204: Machine Drawing

0-0-3-2

Prerequisite: ZZU103

Principles of orthographic view applied to machine drawing, sectional views, threaded fastenings, welded joints, riveted joints, pipe joints, shaft couplings, keyed joints, pulleys, gear teeth and gears, bearings, assembly drawings, engine parts, jigs and fixtures, valves and boiler mountings, Designation of surface texture, limits fits and tolerances, working drawing of simple machine elements, introduction to CAD, Use of Commercially available software packages in Solid Modeling and Simulation.

Text Book:

1. Bhatt N.D., and Panchal V.M., Machine Drawing, Charotar Publishing House, 2006.

Reference Books:

1. Narayana K.L., Kannaiah P., and Reddy K.V., Machine Drawing, Wiley Eastern.
2. John K.C., and Varghese P.I., Machine Drawing, VIP Publication
3. Gill P.S., A Text Book of Machine Drawing, Karlson Publication
4. Pippenger J., and Hicks T., Industrial Hydraulics, McGraw Hill
5. Sidheswar N., Kannaiah P., and Sastry V. V. S., Machine Drawing, Tata McGraw Hill

MEU205: Fluid Mechanics and Machinery

3-0-0-3

Fluid statics, pressure measurement, forces on bodies, fluid dynamics, one dimensional equations for fluid flow, Bernoulli equation and its applications, introduction to multi dimensional flow, pumping machinery, centrifugal pumps and reciprocating pumps, turbines, generation of power from fluid flow, Francis, Kaplan and Pelton turbines.

References:

1. Shames, I.H., Fluid Mechanics, McGraw Hill Book Co.
2. Vijay Gupta and Santosh Gupta, 'Fluid Mechanics and its Applications', Wiley Eastern Ltd.

MEV291: Production Technology Lab -I**0-0-3-2**

Classification of Machine tools and processes, Machining on centre lathes, study of parts and function, cutting tools, types and materials, Grinding, selection of speeds, feeds and depth of cut, Cutting fluids, methods of work holding, Lathe operations like turning, taper turning and eccentric turning, thread cutting, knurling, drilling boring and profile turning, tolerance and surface finish.

MEU292: Fluid Mechanics and Fluid Machinery Laboratory**0-0-3-2**

Study of plumbing tools and pipe fittings, Measurement of metacentric height and radius of gyration of floating bodies, Measurement of viscosity of fluids, Study of viscosity measuring instruments, Study and experimentation on discharge measuring instruments like venturimeter, orificemeter, notches, weirs, nozzle meters and rotameters, Measurement of pressure and velocity, Pipe friction, Minor losses in pipes, Verification of Bernoulli's theorem, Demonstration of laminar and turbulent flow in pipes, Critical velocity, Forces on curved and plane surfaces, Evaluation of the performance of turbines, Main and operating characteristics, Muschel curves, Performance of pumping and other machinery, Centrifugal pump, Reciprocating pump, Gear pump, Hydraulic ram and Torque converter.

FOURTH SEMESTER**MAU202: Mathematics IV****3-0-0-3**

Power series solution of differential equations, Legendre equation, Bessels equation, Sturm-Liouville problem, Eigen functions, Partial differential equations – Methods of solving PDE, Ethic, Parabolic and hyperbolic equations, typical examples and their solution, complex analysis, analytic functions and their applications, conformal mapping, Evaluation of real integrals, residue theorem, Laurents series, Taylor series and Maclariuns-series.

Text Book:

1. Kreyzig. E , Advanced Engineering Mathematics, 8th Ed., John Wiley & Sons, 2000.

References:

1. Wylie, C.R. & Barret L.C, Advanced Engineering Mathematics, 6th Ed., McGraw Hill, New York, 1995.

MEU212: Theory of Machines - I**3-0-0-3****Prerequisite: ZZU102**

Introduction to kinematics and mechanisms, Mechanisms in machine tools, Position, displacement, velocity and acceleration analysis - graphical and analytical methods, Computer oriented methods in kinematic analysis, Cam design and analysis, Kinematics of gearing, Gear trains and applications, Kinematic synthesis - graphical and analytical techniques, Case studies in synthesis of mechanisms.

Textbooks:

1. Shigley, J.E., and Uicker, J.J. Jr., Theory of Machines and Mechanisms, McGraw Hill, Second Edition, 1995.

References:

1. Erdman, A.G., and Sandor, G.N., Mechanism Design: Analysis and Synthesis, Vol. I & II, Prentice Hall of India.

2. Mabie, H.H., and Reinholtz, C.F., Mechanisms and Dynamics of Machinery, John Wiley & sons.
3. Ghosh, A., and Mallik, A.K., Theory of Mechanisms and Machines, Affiliated East West Press.
4. Martin, George T., Kinematics and Dynamics of Machines, McGraw Hill.
5. Nikraves, P.E., Computer Aided Analysis of Mechanical Systems, Prentice Hall.
6. Sen, G.C., and Bhattacharyya, A., Principles of Machine Tools, New Central Book Agency, Calcutta, 2002.
7. Rao. R.V., Metal Cutting and Machine Tools, S.K. Kataria & Sons, 1998.

MEU215: Thermodynamics and Heat Transfer

3-0-0-3

Thermodynamic system, properties of state, thermodynamic equilibrium, zeroth law, first law, and second law, reversible and irreversible processes and cycles, entropy, Helmholtz and Gibbs functions, Joule Thomson effects, heat transfer through solids, the conduction equation, energy transport by natural and forced convection, application to heat exchangers, evaluation of radiation effects

References:

1. Nag P.K, Engineering Thermodynamics
2. Holman J.P, Heat Transfer, McGraw Hill International Student Edition

MEU218: Theory of Elasticity and Plasticity

3-0-0-3

Prerequisite: MEU202

Analysis of Stress and Strain, equilibrium equations, Compatibility Conditions, Stress-Strain Relations, Two dimensional problems, Torsion, Bending of beams, Yield criteria, Stress space representation of von-Mises and Tresca criteria, Plastic stress-strain relations, Experimental verification, Analysis of Elastic-Plastic problems (Spherical shell and Cylindrical shell under internal pressure, rotating Discs etc.).

References:

1. Timoshenko, S.P., and Goodier, J.N., Theory of Elasticity, McGraw Hill International Edn., Third Edn., 1970.
2. Srinath, L.S., Advanced Mechanics of Solids, Tata McGraw Hill Book Co, New Delhi, Second Edition, 2003.
3. Johnson, W., and Mellor, P.B., Engineering Plasticity, Van Nostrand Reinhold, 1973.

MEV214: Metrology and Computer Aided Inspection

3-0-0-3

Prerequisite: Nil

Measurement fundamentals, Uncertainty analysis, Interferometry, Transducers, Surface Finish Measurement, Gauge Design and Tolerancing, Screw Thread and Gear Measurements, CMMs, Machine Vision.

References:

1. Collet C.V. and Hope A.D., Engineering Measurements, Second Edition, ELBS Longman.
2. Chapman, W. A. J., "Workshop Technology – Part 3" Oxford & IBH Publishing Co Pvt Ltd, New Delhi.

MEV215: Metal Casting and Joining

3-0-0-3

Prerequisite: Nil

Fundamentals of Casting and Expendable Mold processes, Pattern making, shrinkage and contraction, Use of cores. Properties of molding sands, bonding materials, testing of

sands. Molding Processes, Sand and Permanent. Melting furnaces. Homogeneous and heterogeneous nucleation, types of growth. Flow effects of metal in mold, gating and riser design. Cleaning of castings. Metal gas interaction, casting defects, inspection and QA. New casting methods. Solidification modeling and simulation Use of Computer codes in casting design. Metallurgy of welding, Residual stresses in welds, Hot and cold cracking of welds, Soldering and brazing. Gas welding, arc welding and resistance welding, Evaluation of welds (NDT methods), Diffusion bonding, Adhesive bonding.

References:

1. Ghosh A., and Mallik A.K., Manufacturing Science, Affiliated East West Press,.
2. Heine R. and Rosenthal, P., Principles of Metal Casting, Tata McGraw Hill.
3. Richard A. Little, Welding and Welding Technology, Tata McGraw Hill.

CEG291: Strength of Materials Laboratory

0-0-3-2

Study of extensometer and strain gauges, Simple tension test, double shear test, Rockwell, Brinell and Vickers hardness tests, Izod and Charpy impact tests, Strength of open coiled and closed coil springs, bending, torsion, compression and fatigue tests.

MEV293: Metrology and Instrumentation Laboratory

0-0-3-2

Study of and Measurements using, Universal Measuring Microscope, Tool Makers Microscope, Profile Projector, Surface Roughness tester and CMM, Calibration of Strain gauge load cells, pressure gauges, LVDT, thermocouple, and Tachometers, Limits and fits, Psychrometers and preparation of Psychrometric charts, analysis of measurement systems, Study and measurement with other instruments like, thread pitch gauge, thread micrometer, disc micrometer, height gauge, slip gauges, optical flats, three pin micrometer, pyrometer etc.

FIFTH SEMESTER

MEV301: Principles of Management

3-0-0-3

Prerequisite: Nil

Introduction to management theory – System approaches to Management – Levels of Manager and Skill required - Management – Process – Planning – Types – Organising – Delegation – Span of Control – Organisation Structures – Directing – Leadership – Motivation – Controlling - Decision Making – Strategic and Tactical Decisions – Single stage decision making – Decision making under certainty – Risk – Uncertainty - Multistage Decision making – Decision Tree - Project Management – Network construction – Arrow diagram – CPM and PERT Networks – Probability of completion of project – Introduction to crashing - Introduction to functional areas of management – Operations Management – Human resource management – Marketing management – Financial management.

Text Books:

1. Koontz & Weihrich, Management, 9th edn., McGraw Hill, 1999.
2. Ravindran, Philips and Solberg, Operations Research: Principles and Practice. Second edition, 2005, John Wiley & Sons.

References:

1. Stoner et-al, Management, 6th edn., Prentice Hall, 1999.
2. Mazda, Engineering Management, Addison Westey, 1999.
3. Certo S., Modern Management, 8th edn., Prentice Hall, 2003.

4. Wiest and Levy, A Management Guide to PERT/CPM with GERT/PDM/DCPM and other Networks, Second edition, 1998, Prentice-Hall of India
5. Tersine, Production/Operations management, Second Edition, 1985, North-Holland

ZZU301: Environmental Studies

3-0-0-3

Unit 1: The Multidisciplinary nature of environmental studies. Unit 2: Natural Resources, Renewable and non-renewable resources: Natural resources and associated problems, Unit3: Eco Systems, Unit 4: Bio diversity and its conservation, Unit5: Environmental Pollution, Unit 6: Social Issues and the Environment, Unit 7: human population and the environment, Unit 8. Field Work.

References :

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
 2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd, Ahmedabad - 380013, India, Email: [m~pin\(Ci\).icenet.net](mailto:m~pin(Ci).icenet.net) (R)
 3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
 4. Clark.R.S., Manne Pollution, Clarendon Press Oxford (TB)
 5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M:T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
 6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
 7. Down to Earth, Centre for Science and Environment(R)
 8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p
 9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
 10. Heywood, V.H & Watson, R.T. 1995 . Global Biodiversity Assessment. Cambridge Univ. Press 1140p
 11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya -Pub. House, Delhi 284 p.
 12. McKinney, M.L. & Schocr, R.M, 199p. Environmental Science systems & Solutions, Web enhanced edition. 63.9p.
 13. Mhaskar A.K, Matter Hazardous, Techno-Science Publications (TB)
 14. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co.(TB)
 15. Odum, E.P. 1971. Fundamentals of Ecology. W.B.Saunders Co. USA, 574p
 16. Rao M.N. & Datta, A.K. 1987.
 16. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ud. 345p
 17. Sharma B.K., 2001. Environmental Chemistry. Goel Publ. House, Meerut
 18. Survey of the Environment, The Hindu (M)
 19. Townsend C. , Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
 20. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
 21. Trivedi R.K. and P.K. -Goel, Introduction to air pollution, Techno-Science Publications (TB)
 22. Wagner K.D., 1998, Environmental Management, W.B. Saunders Co. Philadelphia, USA 499p.
- (M) Magazine (R)Reference (TB) Textbook

MEV302: CAD/CAM/CIM**3-0-0-3****Prerequisite: Nil**

Design process and CAD/CAM; review of basics of interactive computer graphics; Design of 3D curves; Hermitian interpolation, Bezier curves, B-spline curves, Design of surfaces; Coons patches; Bezier surfaces; B-spline surfaces, general surface design processes, Representation of solid models; b-rep models; csg models; CNC machine tools, constructional features, drives and controls, CNC manual part programming and computer assisted programming, computer integrated manufacturing systems, computer aided inspection, group technology, flexible manufacturing systems, industrial robotics and machine vision, rapid prototyping, design for manufacturability, process planning and concurrent engineering, lean production and agile manufacturing, Reconfigurable Manufacturing Systems.

Current Developments in CAD/CAM/CIM – Student Presentation and/or Poster (2-3 students per team)

References:

1. David F. Rogers & J H Adams; Mathematical Elements of Computer Graphics ; McGraw Hill International
2. Ibrahim Zeid; CAD/CAM Theory and Practice, Tata McGraw Hill publishing company.
3. Yoram Koren; Computer Control of Manufacturing Systems, McGraw Hill Book Company.
4. Mikell P. Groover; Automation, Production Systems, and Computer Integrated Manufacturing, Pearson Education
5. HMT Limited; Mechatronics, Tata McGraw Hill Publishing Company Limited

MEU303: Thermal Engineering**3-0-0-3**

Internal combustion engines, 2 stroke and 4 stroke SI and CI engines, theoretical and actual cycles, different systems of IC engines, combustion process in CI and SI engines, performance and governing of IC engines, Nozzles, throat pressures and areas for maximum discharge, supersaturated flow, steam turbines, compounding, reheat factor, gas turbine cycles, Joule- Brayton cycle, regeneration, inter-cooling and reheating, reciprocating compressors and rotary compressors, refrigeration, vapour compression and vapour absorption refrigeration, Air conditioning, effective temperature, summer and winter air conditioning system , cooling load and simple air conditioning calculations

References:

1. M.L. Maleev, Internal Combustion Engines, 2nd Edn., McGraw Hill, New York, 1989.
2. W.J. Kearton, Steam Turbines: Theory and Practice, 7th Edn., ELBS Publishers, London, 1988.
3. E.H. Lewitt, Thermodynamics Applied to Heat Engines, 6th Edn., Sir Isaac Pitman & Sons, 1965.
4. H. Cohen, G.F.C. Rogers, Gas Turbine Theory, 4th Edn., Longman, London, 1996.
5. R.K. Rajput, Thermal Engineering, 4th Edn., Laxmi Publications, New Delhi, 2006.
6. M.L. Mathur, R.P. Sharma, Internal Combustion Engines, Dhanpath Rai and Sons, New Delhi, 2005.

MEU305: Theory of Machines - II**3-0-0-3**

Prerequisite: MEU212

Kinematics and Kinetics of rigid body – Euler equations of motion – Euler angles, Gyroscope - Static and dynamic force analysis of machinery – Force analysis of gears – Static and dynamic balancing – balancing of rotating and reciprocating masses – Introduction Vibration analysis: Single and two degree of freedom systems – Analysis of random vibrations – Vibration measuring instruments.

Text Books:

1. Shames, I.H., Engineering Mechanics, Prentice Hall of India, Fourth Edn., 2001.
2. Meirovitch, L., Elements of Vibration Analysis, McGraw Hill, Second Edn., 1986.
3. Holowenko, A.R., Dynamics of Machinery, John Wiley & Sons, 1965.

References:

1. Beer, F.P., and Johnston, E.R. Jr., Vector Mechanics for Engineers – Dynamics, McGraw Hill.
2. Meirovitch, L., Methods of Analytical Dynamics, McGraw Hill.
3. Shigley, J.E., and Uicker J. J. Jr., Theory of Machines and Mechanisms, McGraw Hill, Second Edn., 1995.

MEV391: Production Technology Lab II**0-0-3-2**

Study and practice of metal cutting operation by shaper, milling machine, slotting machine, drilling machine, grinding machine

Introduction: Limits and Fits, Horizontal and Vertical milling machine – Spindle drives and feed motion - Milling cutters – indexing head – Simple, compound and differential indexing, shaping machine - cutting motion, slotting machine, Grinding machine – Surface, cylindrical and centreless grinding – Tool and cutter grinder, unconventional machining, NC/CNC machine.

MEU392: Thermal Engineering Laboratory**0-0-3-2**

Study of IC engines, automotive parts, experimentation for the determination of the performance of petrol engines, diesel engines and compressors, flash point, fire point, calorific value and viscosity of oils, analysis of exhaust gas, measurement of thermal conductivity of materials, performance of heat exchangers.

SIXTH SEMESTER**MEV311: Machine Tools****3-0-0-3****Prerequisite: Nil**

Metal cutting machine tools: Basic concepts – Tool – work motion – cutting variables. Machining Time – Drive mechanisms – Layout of speeds – Ray diagram for machine Tool gearboxes – stepped and stepless speed drive. Machine tool dynamics – Chatter. Design of modern CNC machines and mechatronic elements – Positioning accuracy and repeatability of CNC Machine tools – Acceptance testing of machine tools – Industrial design, aesthetics and ergonomics.

Metal forming machine tools, Machines for rolling, forging, extrusion and drawing operations, allowances and tolerances for forming operations, High energy rate forming processes, Design considerations for Machine tools. Non-traditional machining

processes: Principles, process characteristics and application of ECM, EDM, AJM, USM, EBM & LBM - Capability analysis.

References:

1. Yusuf Altintas, Manufacturing Automation, Cambridge University Press, 2000.
2. George Tlusty, Manufacturing Process and Equipment, Prentice Hall, 1999.
3. Sen & Bhattacharya, Principles of Machine Tools, Central Book Agency, Calcutta
4. Koenigsberger, Design Principles of Metal Cutting Machine Tools.
5. Manfred Weck, Handbook of machine tools, Vol. 1 – 4, John Wiley & Sons
6. Acherkan, Principles of Machine Tools, Vol. 1, 2, 3 & 4, MIR Publishers.
7. HMT Limited; Mechatronics: Tata McGraw Hill Publishing Company Limited, 1998.
8. N. K. Mehta, Machine Tool Design & Numerical Control, Tata McGraw Hill.

MEV312: Production Management

4-0-0-4

Prerequisites: MAU101 and MAU201

Characteristics of production systems - Operation strategy and competitiveness – Product design and process selection – Quality function deployment – Value analysis – Break even analysis – Strategic capacity planning – Forecasting – Time series analysis – Production Planning and Control – Framework – Material requirement planning (MRP) – System Dynamics – Production activity control – Finite loading – Priority sequencing - Inventory Control – Functions of inventory - Selective Inventory control - Independent demand systems: Deterministic models - Introduction to independent demand systems: probabilistic models – Basic concepts of supply chain management & Logistics management - Facilities Planning – Facilities planning strategies - Flow, space and activity relationship - Systematic layout planning – Types of layout – Quality Management – Analytical tools for quality control- Introduction to TQM – Introduction to Six sigma – Statistical process control – Introduction acceptance sampling.

Text Books:

1. Chase, Aquilano and Jacobs, Operations Management for Competitive Advantage, Tenth Edition, 2003, Tata McGraw-Hill Edition
2. Tersine, R. J., Principles of Inventory and Materials Management, Fourth Edition, Prentice-Hall Inc., New Jersey, 1994.
3. Vollmann, Berry, Whybark, and Jacobs, Manufacturing Planning and Control for Supply Chain Management, 2005, Fifth Edition, Tata McGraw-Hill.
4. Francis, *et al.*, Facility Layout and Location, Second Edition, 1999, Prentice Hall of India.

References:

1. Tomkins, White, Bozer, Frazelle, Tanchoco and Trevino, Facility Planning, Second Edition, John Wiley & Sons

MEV313: Quantitative Techniques for Executive Decisions

3-0-0-3

Prerequisites: MAU101, MAU102 and MAU201

Methodology of operations research, Linear programming, model formulation Graphical solution, Theory of simplex method, Two-phase method, Charne's Method, Duality Primal-dual relationships, Formulation and solution of transportation problem and assignment problem, Games theory, Two-person zero-sum games, Graphical method and linear programming method, Dynamic programming problems with a finite number of consecutive decisions, Queuing theory, Steady state solution of single server model (Poisson input and exponential service times).

Text Books:

1. Hadley, G., Linear Programming, Addison Wesley/Narosa, Narosa Publishing House, 1994.
2. Taha, H.A., Operations Research: An introduction, Seventh Edition, Prentice Hall of India Private Limited, New Delhi, 2003.

References:

1. Hillier, F.S., and Liberman, G.J., Introduction to Operations Research: Concepts and Cases, Eighth Edition, McGraw-Hill International Edition, 2005.
2. Ravindran A., Philips, D. and Solberg, J.J., Operations Research: Principles and Practice, Second Edition, John Wiley & Sons Inc., 2005.
3. Murthy, K.G., Linear and Combinatorial Programming, John Wiley & Sons, 1976.

MEU315: Design of Machine Elements

4-0-0-4

Prerequisites: MEU202 and MEU212

Steps in design process; selection of materials; theories of failure; design for static loading; impact and fatigue load considerations; stress analysis and design of threaded members; bolted joints; design of welded joints; stress analysis and design of helical and leaf springs; design of shafts and keys. Design of spur, helical, bevel and worm gears for static load, dynamic load and surface durability. Types of lubrication; lubricants; hydrodynamic theory of lubrication; design of journal bearings; heat balance. Rolling contact bearings - bearing life; static and dynamic capacity; selection of bearings with axial and radial loads.

References:

1. J.E. Shigley, Mechanical Engineering Design, McGraw Hill, First Metric Edn., 1986.
2. J.E. Shigley, and C.R. Mischke, Mechanical Engineering Design, Tata McGraw Hill, Sixth Edn., 2003.
3. M.J. Siegel, V.L. Maleev and J.B. Hartman, Mechanical Design of Machines, International Textbook Company
4. R.M. Phelan, Fundamentals of Mechanical Design, Tata McGraw Hill
5. V.L. Doughtie and A.V. Vallance, Design of Machine elements, McGraw Hill.
6. R.C. Juvinall and K.M. Marshek, Fundamentals of Machine Component design, John Wiley & Sons
7. R.L. Norton, Machine Design, Pearson Education

Data Handbooks (allowed for reference during examinations also):

1. Prof. B.R. Narayana Iyengar and Dr. K. Lingaigh, Machine Design Data Handbook, Vol. I & II
2. P.S.G. Tech., Machine Design Data Hand Book.

MEV392: CAD/CAM/CIM Laboratory

0-0-3-2

Exercises on Solid Modeling: using commercial packages like IDEAS, Pro-E, CATIA.

Exercises on Finite Element Analysis: Introduction to FEM- 1D, 2D and 3D elements- Exercises on Heat Conduction, fluid flow and Elasticity may be given using commercial FEM packages like ANSYS, ABAQUS.

Assembly and Mechanism Design: Assembling of various parts and Tolerance analysis Synthesis and Design of Mechanisms-Animations Exercises on various mechanisms like four bar linkages and its variations, cam and follower, Two and Four Stroke engines. Design for manufacturability-use of commercial software packages.

Computer Aided Manufacturing: Process Control using PLC-PID control strategy Part Programming fundamentals- Manual Part Programming and Computer Aided Part

Programming. Exercises on CNC Lathe and Machining Center/Milling Machines, **Programming of Industrial Robots:** Computer Aided Inspection and Quality Control, Demonstration of the capability of Coordinate Measuring Machine using a sample component e.g.: Engine Block – Concepts of Reverse Engineering and Rapid Prototyping Technology.

MEV398: Mini Project/ Industrial Training

0-0-3-1

Students may undertake short research projects under the direction of members of the faculty, normally 3 hrs/week. A written, detailed report describing the project and results is required. Students are expected to undertake fabrication work of new experimental set up/devices or develop software packages for the various laboratories in the department. Students may opt to undertake with help from the Department of Training and Placement, Internship in the field of Mechanical Engineering by undergoing in-plant training of at least one-month duration in reputed industries/research centers in the country. The industrial training is expected to be undertaken during the semester recess. The student writes a final report on this training and makes an oral presentation before an evaluation committee.

SEVENTH SEMESTER

MEV402: Theory of Metal Cutting

4-0-0-4

Prerequisite: Nil

Kinematic elements in metal cutting – Tool in hand nomenclature – Mechanics of chip formation – orthogonal and oblique cutting – shear angle – velocity relationship. Merchant's analysis of cutting forces – cutting power estimation. Tool Dynamometers: Turning, Milling, Drilling and Grinding Dynamometers. Thermal aspects of machining: Failure of cutting tools: Tool wear - Flank and crater wear - mechanisms of wear Taylor's tool life equation – Tool life testing – Economics of machining: Selection of optimal machining conditions and productivity - Machinability: Criteria and factors affecting machinability – Advances in cutting tool materials – Abrasive machining processes – mechanics of grinding – power requirements – Mechanics of wheel wear – Creep feed grinding – Thermal aspects of grinding process – Surface integrity – Methods of improving surface integrity.

References:

1. Trent E.M and P.K. Wright, Metal Cutting, 4th Edn., Butterworth-Heinemann, 2000.
2. David A. Stephansons, Metal Cutting Theory and Practice, Marcel Dekker, 1996.
3. Ghosh, A., and Mallik, A.K., Manufacturing Science, Affiliated East West Press.
4. Shaw, M.C., Metal Cutting Principles, Oxford University Press, 2nd Edn., 2004.
5. Kronenberg: Machining Science and Applications, MIR

MEV403: Introduction to Mechatronics

3-0-0-3

Prerequisite: ZZU191 and ECU101

Introduction To Mechatronics System-Key elements- -Advanced Approaches in Mechatronics-Actuators, Sensors and Transducers- Selection of Sensors and actuators

Introduction to Signals, system and Controls-System representation-Linearisation-Time Delays- PID Controller, Digital Controllers- adaptive Control-introduction to Microprocessors, Micro-controllers and Programmable Logic Controllers-PLC programming-Advanced Applications in Mechatronics-Artificial Intelligence in Mechatronics-Fuzzy Logic Application in Mechatronics-Case Studies of Mechatronics Systems.

Text Books

1. Bolton, W, Mechatronics, Pearson education Asia 2004.
2. Devadas Shetty, Richard A Kolk, Mechatronics System Design, Thomson Learning, 2001

References

1. Dan Neculescu Mechatronics, Parson education Asia 2002.
2. HMT Ltd, Mechatronics, TMH 1998.
3. B.P.Singh, Microprocessors and Microcontrollers, Galgotia Pub First Edn, 1997.
4. Frank D.Petruzella, Programmable Logic Controllers, TMH, 1989.
5. Krishna Kant, Computer Based Industrial Control, PHI, 1999.

MEV491: Management Science Laboratory

0-0-3-2

Prerequisite: MEV312 and MEV313

Statistical Process Control, Construction of Process Flow Charts, Learning Curve, Determination of Standard Time, Performance Rating Analysis, Study of effect of method and workplace layout on performance, Visual Acuity test, Coordination test, Determination of Production System Parameter Through Simulation, Simulation of Single Server Queuing System, Simulation of Inventory system, Monte Carlo Simulation, Design of manufacturing cell, Mathematical Model formulation and solution of decision problems in operations management using LINGO

MEV492: Metal Cutting Laboratory

0-0-3-2

NC and CNC machines, Measurement of cutting force in various machine tools; study of the variation of cutting force with parameters like cutting velocity, feed, depth & tool geometry, study of influence of cutting fluids on machining, study of tool and cutter grinder, surface integrity studies on parts machined in traditional machine tools

MEV498: Project

0-0-3-3

Students are required to enroll in this course to complete the degree requirements. The project work commenced in VII Semester shall be continued in VIII Semester, normally 3 hours/week. At the end of seventh semester, a mid term evaluation will be conducted by a project evaluation committee.

EIGHTH SEMESTER

MEV411: Industrial Engineering

3-0-0-3

Prerequisite: MAU201

Productivity, Method study, Process and Operation analysis, Motion analysis, Principles of motion economy, Introduction to Ergonomics, Time study, Standard time determination, Incentive plans, Work sampling, Pre-determined Motion Time Systems,

Job analysis, Job evaluation, Merit rating, Principles of costing, Methods of costing, Depreciation and replacement analysis.

Text Books:

1. I. L. O., Introduction to Work Study: Indian Adaptation, Third (Revised Edition), 1997, Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
2. Barnes, R. M.: Motion and Time Study: Design and Measurement of Work, 7e, 1980, John Wiley & Sons, NY.
3. Khan M.Y. and P.K. Jain, Management Accounting, 3rd edition, 2002, Tata McGraw Hill.

MEV412: Tool Engineering and Design

3-0-0-3

Prerequisite: Nil

Design of chips forming tools – milling, drilling, boring, grinding tools – vibration damping of boring bars – press working tools – Punch and Die size and press tonnage calculations – Black development – die design for simple components – Fixture design – principles of location and clamping – Design of fixtures for milling of simple components – Design of jigs for drilling and reaming – Indexing jigs.

References:

1. Bhattacharya, A., Metal Cutting Theory and Practice, Central Book Publishers.
2. ASTME, fundamentals of Tool Design, Prentice Hall.
3. Wilson, F.W., Hand Book of Fixture Design, McGraw Hill.

SHU417: Industrial Economics

3-0-0-3

Industrial efficiency: Concepts and Measurement, efficiency conditions in the theory of production, efficiency and decision making process. The organizational form and Alternative motives of the firm, Types of organizational form, Demand Analysis The elasticity concept, Demand forecasting, The cost theory and optimum size of the firm, the theory of cost and production, the efficiency and size of the firm Market Structure Some concepts – standard forms of Market structure – The concept of workable competition. Market structure and Innovation, Diffusion of New Technology, Finance and Accounting sources of finance in Indian situation, an evaluation of Indian Industrial policy, Labour productivity and its measurement

References:

1. Barthwal, R.R., Industrial Economics, John Wiley
2. Stewart, W., Industrial Economics and Applied approach, Mc Millan.
3. Clark, R., Industrial Economics, Blackwell Oxford.

MEV499: Project

0-0-6-5

Students are required to enroll in this course to complete the degree requirements. The project work commenced in VII Semester shall be continued in VIII Semester, normally 3 hours/week. At the end of the semester, a thesis written in an acceptable style describing an original research project, and a successful oral defense of the thesis topic before a project evaluation committee are required.

MEV493: Seminar

0-0-3-1

Each student shall prepare a technical paper and make a 20 – 30 minute oral presentation on a current research topic relevant to mechanical engineering to the rest of the class, after scrutiny and approval of the faculty- in charge of seminar. The oral presentation and a final technical report (in the format of an ASME journal paper of not less than 12 pages) are evaluated by faculty members in charge of seminar. Appropriate weights may

be given for communications skills (both verbal and written) as well as for capacity to impress the audience and ability to handle question & answer (Q&A) sessions.

Electives:

MEU321: Unconventional Energy Systems

3-0-0-3

Energy outlook, solar energy systems, biomass utilization, wind energy calculations and usage, mini and micro-hydel plants, scope and economics of unconventional energy systems, introduction to integrated energy systems.

References:

1. S. P. Sukhatme, Solar Energy-Principles of Thermal Collection and Storage, Tata McGraw Hill, 1996
2. A.N. Mathur and N.S. Rathore, Bio-gas Production, Management and Utilisation, Himansu Publications, 1992
3. L.L. Ferris, Wind Energy Conversion Systems, Prentice hall 1990

MEV323: Introduction to Marketing

3-0-0-3

Prerequisite: Nil

Marketing defined – scope and concepts – analysing opportunities and market planning – consumer and business markets – segmentation – product life cycle – advertising – sales promotion-marketing communication – changing practices.

Text Book:

1. Kotler, P., Marketing Management, McMillan India Ltd., New Delhi

MEV324: Design and Analysis of Information Systems

3-0-0-3

Prerequisite: Nil

Concept of data and information - economies of information – building blocks of information systems – General system design – System analysis – charting tools – coding considerations – Forms design – File storage consideration – Sorting and searching techniques – verification, audit – Security features.

References:

1. Burch and Grudnitski, Information systems-Theory and Practice, John Wiley and Sons, New York 1989
2. O'Brien, J.A., Management Information Systems, Tata McGraw Hill, 1999.

MEV330: Design for Manufacturability

3-0-0-3

Prerequisite: Nil

DFMA concepts, Why DFMA? Concurrent engineering -Product/process design, Design-manufacturing integration, Product life-cycle analysis, Product life-cycle design and manufacture, Sustainable products, Product sustainability- Definition, Measurement, Quantification. Integrated product sustainability rating (PSI), Product specification, standardization and tolerance analysis, Functional requirements and datum features Materials selection, Selection of manufacturing processes-Manufacturability, Break-even analysis, Process planning considerations in design for manufacturing-Basics of group technology, Design methodologies, Design for machining, Machinability and machining performance evaluation, Basic elements of machining system Cutting tool selection, Jigs and fixtures , Machining optimization , Product design for assembly, Methodology, Assembly efficiency, Classification systems, Robotic assembly -Selected case studies. Design for sheet metalworking, Design for injection molding, Design for die-casting, Design for hot forging.

References:

1. Chitale, A.K. and Gupta, R.C., Product Design and Manufacturing, Prentice hall India Ltd.
2. Dieter, D.E., Engineering Design: a Material and Processing Approach, McGraw Hill International.
3. R. Bakerjian, (Editor), Design for Manufacturability, 1992, Tool and Manufacturing Engineers Hand Book, Society of Manufacturing Engineers, Michigan.

MEU331: Computational Methods in Engineering**3-0-0-3**

Introduction to computational methods; Computational procedure; Numerical errors and accuracy; Iterative convergence; Roots of equations; Numerical curve fitting and interpolation; Numerical differentiation; Numerical Integration; Numerical solution of simultaneous linear algebraic equations; Numerical solution of ordinary differential equations.

References:

1. Chapra, S.C. and Canale, R.P., Numerical Methods for Engineers, Fourth Edition, Tata McGraw-Hill, 2002.
2. Jaluria, Y., Computer Methods for Engineering, Allyn and Bacon, Inc., 1988.
3. James, M.L., Applied Numerical Methods for Digital Computations, Third Edition, Harper and Row, 1985.

MEU322: Introduction to Finite Element Methods**3-0-0-3****Prerequisites: MAU101 and MAU102**

Linear Vector Spaces, Variational Methods of approximation – FE analysis of one-dimensional and two-dimensional problems. Applications to heat transfer, elasticity and fluid mechanics problems. FE analysis of Eigen value problems and non-linear problems.

Text Books:

1. Reddy, J.N., An Introduction to the Finite Element Method, Tata McGraw Hill Third Edn., 2005.
2. Reddy, J.N., Applied Functional Analysis and Variational Methods in Engineering, McGraw Hill International Edition, 1987.

References:

1. Huebner, K. H., The Finite Element Method for Engineers, John Wiley.
2. Zenkiewicz, O. C., The Finite Element Method, Tata McGraw Hill Edition.
3. Zienkiewicz, O.C., and Morgan, K., Finite Elements and Approximation, John Wiley & Sons, 1983.
4. Cook, R.D., Malkus, D.S., Plesha, M.E., and Witt, R.J., Concepts and Applications of Finite Element Analysis, John Wiley & Sons, Fourth Edn., 2004.

MEU325: Experimental Stress Analysis**3-0-0-3****Prerequisites: MEU202 or Equivalent (Consent of teacher)**

Basic equations and formulation of problems in elasticity – Strain measurement methods and related instrumentation – Basic optics – Theory of photo-elasticity – Brittle coating methods.

Text Book:

1. James W. Dally, and William E. Riley, Experimental Stress Analysis, McGraw Hill, Third Edn., 1991.

References:

1. R.G. Budynas, Advanced Strength and Applied Stress Analysis, McGraw Hill, Second Edn., 1999.
2. L. S. Sreenath, M. R. Raghavan, K. Lingaiah, G. Garghesha, B. Pant, and K. Ramachandra, Experimental Stress Analysis, Tata McGraw Hill
3. S.P. Timoshenko and J.N. Goodier, Theory of Elasticity, McGraw Hill, New York, Third Edn., 1970.

MEU326: Fluid Power Control**3-0-0-3****Prerequisite: MEU205**

Introduction to oil hydraulics and pneumatics, ISO Symbols and standards, ideal pump and motor analysis. Practical pump and motor analysis. Performance curves and parameters. Direction, pressure and flow control valves, flow forces and lateral forces on spool valves, Flapper valve Analysis and Design, Electro hydraulic servo valves, Bypass Regulated and Stroke Regulated Hydraulic Power Supplies, Direction, flow and pressure control valves in pneumatic systems, Examples of typical circuits using Displacement – Time and Travel-Step diagrams. Will-dependent control, Travel-dependent control and Time-dependent control, Combined Control, Program Control, Sequence Control, Electro-pneumatic control and air-hydraulic control.

References:

1. Blackburn, J. F., G. Reethof, & J. L. Shearer., Fluid Power Control, New York, Technology Press of M. I. T. & Wiley.
2. Anthony Esposito, Fluid Power with applications, 5th edn., Pearson Education 2000.
3. Ernst, W., Oil Hydraulic Power & its Industrial Applications, 2nd edn., New York: McGraw Hill.
4. Lewis, E. E., & H. Stern, Design of Hydraulic Control Systems, New York, McGraw Hill.
5. Morse, A. C., Electro hydraulic Servomechanism, McGraw Hill, New York.
6. Pippenger, J.J., and R.M. Koff, Fluid Power Control systems, New York: McGraw Hill.
7. Fitch, Jr., E.C., Fluid Power Control Systems, McGraw Hill, New York.
8. Khaimovitch., Hydraulic & Pneumatic Control of Machine Tools.
9. John Watton., Fluid Power Systems: modeling, simulation & micro computer control, Prentice Hall International, 1989.
10. Herbert E. Merritt., Hydraulic control systems, John Wiley & Sons Inc.
11. Thoma, Jean U., Hydrostatic Power Transmission, Trade & Technical Press, Surrey, England.
12. Ian Mencil., Hydraulic operation & control of Machine tools – Ronald Press.
13. Hasebrink J.P., & Kobler R., Fundamentals of Pneumatics /electropneumatics, FESTO Didactic publication No. 7301, Esslingen Germany.
14. Werner deppert & Kurt Stoll., Pneumatic Control-An introduction to the principles, Vogel-Verlag English ed., 1985, Germany.
15. Blaine W. Andersen., The analysis & Design of Pneumatic Systems, John Wiley & Sons, Inc.
16. Sterwart., Hydraulic & Pneumatic power for production-Industrial Press.

MEV327: Human Factors in Engineering and Design**3-0-0-3****Prerequisite: Nil**

Nature of man-machine systems and characteristics; Information input and processing – Sources and pathways of stimuli - Human information processing; Visual displays – Quantitative and qualitative displays, General guidelines in design of visual displays; Auditory and tactual displays; Speech communication; Bases of human motor activity, Human control of systems, Compatibility, Influence of display factors and control factors on system control – Anthropometry.

Text Book:

1. Sanders, M.S., and McCormick, E.J., Human Factors in Engineering and design, McGraw-Hill International editions, Seventh Edition, 1993.

References:

1. Murrell K.F.H. and Schnauber, H.:Ergonomics. Econ, Munich, 1986.
2. Gavriel Salvendy: Handbook of Human Factors & Ergonomics, Inter-science, 1997.

MEV328: Technology Management**3-0-0-3****Prerequisite: Nil**

Introduction to technology management – concepts – technological changes – approaches – technology cycle – technology acquisition – technology transfer, absorption, diffusion intellectual property rights.

Text Book:

O Hawthorne E. P., The Management of Technology, McGraw Hill, 2000.

MEU329: Theory of Metal Forming**3-0-0-3****Prerequisite: MEU214 or MEU218**

Review of the theory of stress and strain - yield criteria - stress space representation - plasticity - true stress strain curves - empirical relations for work hardening materials - behavior of anisotropic materials - plastic stress strain relations - the elastic-plastic problem of bending - torsion - and other simple problems - theory of metal forming operations like drawing extrusion - rolling and forging - slip line field theory - bound theorems.

References:

1. Chakrabarty, J., Theory of Plasticity, McGraw Hill, Second Edn., 1998.
2. Johnson, W., and Mellor, P.B., Engineering Plasticity, van Nostrand Reinhold Co., London, 1973.
3. Hoffman, O., and Sachs, G., Introduction to the Theory of Plasticity for Engineers, McGraw Hill Book Co. New York, 1953.

MEU337: Nonlinear Dynamics and Chaos**3-0-0-3****Prerequisites: MAU101, MAU102, ZZU102 and Consent of Teacher**

Introduction to dynamical systems: discrete and continuous time, concepts of stability, equilibrium solutions: classification and stability of equilibrium solutions-Periodic and quasiperiodic solutions- limit cycle- Poincare' map-bifurcation- local and global bifurcation of continuous systems, chaotic solutions of maps: dynamics of logistic equation- bifurcation diagram-chaotic solutions of continuous systems- tools to identify and analyze motions, fractals and dynamical systems: fractal dimension- Measures of fractal dimension, computational methods-Numerical schemes-determination of Lyapunov exponents-fractal dimensions

References:

1. S.H. Strogatz, *Nonlinear Dynamics and Chaos*, Westview Press, 1994.
2. A.H. Nayfeh and B. Balachandran, *Applied Nonlinear Dynamics*, John Wiley & Sons, 1995
3. J.M.T. Thomson and H.B. Stewart, *Nonlinear Dynamics and Chaos*, John Wiley & Sons, 1986.
4. F.C. Moon, *Chaotic and Fractal Dynamics*, John Wiley & Sons, 1987.

MEV421: Mechanical Behavior and Testing of Materials**3-0-0-3****Prerequisite: MEV203**

Crystal imperfection – Plastic deformation by slip and twinning – Shear strength of materials – Dislocation theory – Yield point phenomena – Strain hardening – Annealing of cold worked metal – Theory of brittle fracture – Ductile fracture, fatigue – Creep – Fracture at elevated temperatures – The tension test – Instability – Measurement of ductility – Effect of strain rate – Hardness tests – Flow of metal – Torsion test – Torsion stress for large plastic strains – Torsion failure.

Text Book:

ODieter, G.M; Mechanical Metallurgy, McGraw Hill Inc; 2001

References:

1. Hertzberg R.W., Deformation and fraction Mechanics, John Wiley and Sons.
2. Mc Clinock and Ali Argon S, Mechanical Behavior of Materials.
3. Reed Hill and Robert E, Physical Metallurgy Principles, East West Press.

MEU423: Automobile Engineering**3-0-0-3**

Constructional details of engines – various components – cooling systems – lubricating systems – fuel system – ignition system – transmission systems – braking systems – steering mechanism – chassis and suspension – starting mechanism – electrical equipments – trouble shooting – modern trends in automobiles – pollution and control.

References:

1. Joseph Heitner, Automotive mechanics.
2. Newton & Steeds, Automotive mechanics.
3. William Crouse, Automotive engines.
4. A. W. Judge, Motor manual (four volumes).
5. William Crouse, Automotive fuel, lubricating & cooling systems.
6. William Crouse, Automotive chassis & body.
7. William Crouse, Automotive electrical equipments.
8. Crouse & Anglin, Automotive mechanics.

MEU424: Industrial Tribology**3-0-0-3****Prerequisite 1: MEU201 or MEU205****Prerequisite 2: MEU214 or MEU218**

Navier-Stroke's equation; Reynolds equations; Idealized hydrodynamic bearings; finite bearings; Hydrodynamic instability; Externally pressurized and gas lubricated bearings; surface topography; theories of friction; Wear of materials; Measurement of friction and wear.

References:

1. B.C. Majumdar, Introduction to Tribology, A.H. Wheeler, Bangalore.
2. Pinkus and Sternlincht, Theory of hydrodynamic lubrication, John Wiley & Sons, New York.

3. D. F. Moore, Principle and Application of Tribology, Pergamon Press, New York.
4. E. Rabinowicz, Friction and Wear of Metals, John Wiley & Sons, New York.
5. K. L. Johnson, Contact Mechanics, Cambridge University Press.
6. T. R. Thomas, Rough Surfaces, Longman Inc.

MEV425: Supply Chain Management

3-0-0-3

Prerequisite: MAU101 and MAU201

Evolution of Supply Chain Management (SCM) from logistics management - Decision phases in a supply chain - Achieving strategic fit - Supply chain drivers and obstacles - Information technology and SCM - Enterprise resource planning systems and SCM - Role of purchasing in SCM - Sources of supply - Outsourcing and Make or Buy decisions - General procurement procedures - Managing inventories in a supply chain - Inventory models with constraints - Managing uncertainty in a supply chain using safety inventory - Determining appropriate level of safety inventory - Transportation in a supply chain - Design options for a transportation network - Routing and scheduling in transportation - Facility decisions - Models for facility location and capacity allocation.

Text Books:

1. Chopra, S. and Meindl, P., Supply Chain Management: Strategy, Planning and Operation, Pearson Education, Inc., Singapore, Second Edition, 2004.
2. Dobler, D. W. and Burt, D. N., Purchasing and Supply Management: Text and Cases, Sixth Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 1996.
3. Tersine, R. J., Principles of Inventory and Materials Management, Fourth Edition, Prentice-Hall Inc., New Jersey, 1994.

References:

1. Christopher, M., Logistics and Supply Chain Management, Second Edition, Financial Times Professional Limited, 1998.
2. Narasimhan, S. L., McLeavy, D. W. and Billington, P. J., Production Planning and Inventory Control, Second Edition, Prentice Hall of India Private Limited, 1995.
3. Raghuram, G. and Rangaraj, N., Logistics and Supply Chain Management: Cases and Concepts, Macmillan India Limited, New Delhi, 2000.
4. Arnold, J. R. T. and Chapman, S. N., Introduction to Materials Management, Fourth Edition, Prentice-Hall Inc., 1998.
5. Burt, Dobler and Starling, World Class Supply Management: Key to Supply Chain Management, Tata McGraw-Hill, 7th Edition, 2003

MEV426: Cost Analysis and Control

3-0-0-3

Prerequisite: Nil

Cost analysis – need – classification – elements of cost overheads – depreciation – cvp analysis – costing systems – absorption costing, variable costing – standard costing and variance analysis.

Text Book:

1. Khan, M.Y and Jain,P.K., Management Accounting, third edition, Tata McGraw Hill, 2002.
2. D. Williamson, Cost and Management Accounting, Prentice Hall of India, 1999.

MEU427: Aerodynamics

3-0-0-3

Potential theory, conformal transformation, Blassius theorem, Kutta theorem, Jowkowski transformation, Aerofoil, thin aerofoil theory, finite wing theory.

References:

1. Kuethe and Chow, Foundations of Aerodynamics, John Wiley and Sons, 1976
2. Anderson (Jr.), J.D., Fundamentals of Aerodynamics, McGraw Hill,

MEV428: Introduction to Computer Graphics**3-0-0-3****Prerequisite: CSU101**

Aim: To Give an introduction and an overall idea about computer graphics.

Procedural elements of computer graphics- overview of graphics devices, Line and circle drawing algorithms, hidden line removal algorithms, etc. Mathematical elements of Computer Graphics – Viewing transformations, Mathematical modeling of curves and surfaces.

References:

1. Rogers, D.F. and Adams, J.H., Mathematical Elements of Computer Graphics, McGraw Hill International edition, 1990.
2. Rogers, D.F., Procedural Elements for Computer Graphics, McGraw Hill International Edition, 1995.

MEV429: Human Behaviour in Organization**3-0-0-3****Prerequisite: Nil**

Organisation behavior – development – individual behavior values – attitudes – emotions – perceptions – abilities group process – team – communications – conflict – work design and technology – organization culture – change – stress management.

Text Book:

0Robbins, Organizational Behavior, Ninth Edition, Pearson Education 2002.

References:

1. Greenberg and Baron, “Behavior in Organizations”, 7/e, Pearson Education, (2002).
2. Machane and Vonglinow, “Organizational Behavior”, 2/e, TMH, (2003).
3. Hersey, Balaschard and Johnson, “ Management of organizational Behavior”, 8/e, Pearson Education, (2002).

MEV433: Quality Planning and Analysis**3-0-0-3****Prerequisite: MAU201**

Quality management, Quality control, Quality assurance, ISO9000, TQM, Comparison with ISO9000, Statistical process control, Principles of control charts, Control charts for variables and attributes, Process capability analysis, Introduction to six sigma concept, Quality improvement, Principles and methodologies, Reliability and acceptance sampling, Acceptance sampling for variables.

References:

1. D. H. Besterfield et al: Total Quality Management, Pearson Education Asia, 2001
2. J. M. Juran and F. M. Gryna: Quality Planning and Analysis, Tata McGraw Hill (3rd Edition), 1995
3. B. L. Geoetsch and S. B. Davis: Introduction to Total Quality : Quality Management for Production, Processing and Services, (2nd Edition) Prentice Hall, 1997
4. Bharat Wakhlu: Total Quality, Wheeler Publishing, 1998
5. Taguchi G, Elsayed E. A, and Hsiang T. C: Quality Engineering in Production Systems, McGraw-Hill Book Company, International Edition, 1989.
6. E. L. Grant and R. S. Leavenworth: Statistical Quality Control, (7th Edition), 2002, Tata McGraw-Hill.

7. Breyfogle, Forrest, Implementing: Six Sigma : Smarter Solutions Using Statistical Methods, New York – John Wiley & Sons, 1999
8. Harry, Mikel and Rich Schroeder, Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations, New York – Doubleday, 2000.

MEV437: Manufacturing Planning and Control

3-0-0-3

Prerequisite: MEV312

Evolution of manufacturing planning and control system – Continuous improvement – Just-in-time principles – Forecasting – Time series analysis – error measurement – Aggregate planning – Quantitative methods – Master production scheduling (MPS) – MPS technique – Final assembly schedule – Material requirement planning (MRP) – Lot sizing – Buffering concept – pull production systems – Mixed model production schedule – Shop – floor control – Capacity planning and control techniques – Advanced concepts in scheduling.

Text Books:

1. Vollmann, Berry, Whybark, and Jacobs, Manufacturing Planning and Control for Supply Chain Management, 2005, Fifth Edition, Tata McGraw-Hill
2. John M. Nicholas, Competitive Manufacturing Management: Continuous Improvement, Lean production and Customer – Focussed Quality, 2001, Tata McGraw Hill publishing Company Limited.

References:

1. Narasimhan, S. I., McLeavy, D. W., and Billington, P. J., Production planning and Inventory Control, Second Edition, 2000, Prentice-Hall of India.
2. Tersine, R. J., Principles of Inventory and Materials Management, Fourth Edition, Prentice-Hall Inc., New Jersey, 1994.
3. Monks, J. G., Operations Management: Theory and Problems, Third Edition, 1987, McGraw Hill, International Edition.
4. Panneerselvam, R., Production and Operations Management, 2001, Prentice-Hall of India, New Delhi.

MEV430: Consumer Psychology in Marketing

3-0-0-3

Prerequisite: Nil

Consumer – diversity in market place – market segmentation – ethics in marketing – consumer as individuals – consumer as decision makers – consumers in the social and cultural settings.

Text Book:

1. Schiffman & Kanuk, Consumer Behavior, 7/e, Pearson Education, 2000.

References:

1. Solomon, Consumer Behavior, 5/e, Pearson Education, 2001.
2. Peter & Olson, Consumer Behavior & Marketing Strategy, 6/e, TMH, 2001.
3. Arnould, Linda & Zinkhan, Consumers, TMH, (2001).

MEV439: Powder Metallurgy

3-0-0-3

Prerequisite: Nil

Production and characterization of metal powders. Compacting of powder, press and die design, theory of compacting, Powder Injection Moulding, Slip casting, Iso-static pressing. Sintering, sintering atmospheres and hot compaction. Properties of sinterings and their relation to processing conditions. Industrial applications.

Text Book:

F. Thummler and R. Oberacker, An introduction to Powder Metallurgy, The Institute of Materials, The University Press, Cambridge Great Britain. ISBN 0-901716-26-X.

References:

0ASM Handbook: Powder Metal Technologies and Applications (ASM Handbook, Vol. 7) by ASM.

MEV441: Accounting and Finance for Engineers

3-0-0-3

Prerequisite: Nil

Finance – scope – objectives – time value of money – financial accounting – financial statement analysis – sources of finance – working capital – financial planning – capital budgeting.

Text Book:

1. Khan M.Y. and Jain P.K., “Financial Management”, 3rd edition, Tata McGraw Hill (2003)
2. Jawahar lal, “Financial Accounting”, 2nd edition, Wheeler publishing (2000).

References:

1. I.M. Pandey, “Financial Management”, 8th edition, Vikas publishing house (2003).
2. Prasanna Chandra, “Financial Management”, 4th edition, Tata McGraw Hill (2003).

MEV442: Introduction to Robotics

3-0-0-3

Prerequisite: ZZU102

Aim : to give an insight into various topics in robotics

Workspace analysis, direct and inverse kinematics - jacobian and static force analysis - Trajectory generation – Sensors - vision and intelligence.

References:

1. K S Fu R C Gonzales, C S G Lee: Robotics Control, Sensing, Vision and intelligence, McGraw Hill 1987.
2. John J Craig, Introduction to Robotics, Mechanics and control, second edition Addison – Wesley, 1999.
3. Mark W Spong & M Vidyasagar, Robot Dynamics and Control, John Wiley & Sons, 1989.
4. R P Paul: Robot Manipulators Mathematics Programming, Control, The computer control of robotic manipulators, The MIT Press 1979.
5. Robert J Schilling: Fundamentals of Robotics, Analysis and Control. Prentice Hall of India 1996.
6. Gonzalez and Woods, Digital Image Processing, Addison Wesley, 1993.

MEV443: Discrete Event System Simulation

3-0-0-3

Prerequisite: MAU201 and CSU101

Introduction to system concept, modelling and simulation - Monte carlo simulation - Examples of single server queueing systems and inventory systems - Concepts in discrete event system simulation - Event scheduling/time advance algorithm - Random number generation - Random variate generation - Input modelling for simulation - Verification and validation of simulation models - Output analysis for a single model - Simulation modelling and analysis of manufacturing systems – Introduction to simulation software for manufacturing applications.

Text Book:

1. Banks, J., Carson, J.S., and Nelson, B.L., Discrete-Event System Simulation, Second Edition, Prentice Hall of India Private Limited, 1996.

References:

1. Deo, N., System Simulation with Digital Computer, Prentice Hall of India Private Limited, 1996.
2. Gordon, G., System Simulation, Prentice Hall of India Private Limited, 1996.
3. Kelton, W.D., Sadowski, R.P and Sturrock, D.A., Simulation with ARENA, McGraw-Hill Higher Education, Fourth edition, 2007.
4. Law, A.W., and Kelton, W.D., Simulation Modeling and Analysis, Third Edition, McGraw-Hill International Edition, 2000.

MEV444: Management of Human Resources

3-0-0-3

Prerequisite: Nil

Personnel functions – Job analysis – Evaluation – Salary, wages and incentives administration, Dimensions of Human behaviour – measurement – Theories of motion – Group behaviour – labour laws – Industrial conflict resolution, work organization – Process of organizational change.

References:

1. Fred Luthans, “Organizational Behaviour”, McGraw Hill, 10th Edition, 2005.
2. Dwivedi, R.S., “Manpower Management – An Integrated Approach to Personnel Management and Labour Relations”, PHI, 1984.
3. Yoder D., and Staodohar P. D., “Personnel Management and Industrial Relations”, PHI 1986.
4. Monappa A., and Saiyadain M. S., “Personnel Management”, TMH, 1988.
5. Kapoor N. D., “Introduction to Commercial and Industrial Law”, Sultan Chand & Sons, New Delhi, 1986.
6. Monappa A., “Managing Human resource”, Macmillan, Second Edition, 1998