

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT – NUMERIAL METHODS
CODE- BT410

UNIT - I

Approximation and Errors in Computation Approximation and round of errors, truncation errors and Taylor Series, Determination of roots of polynomials and transcendental equations by Graphical methods and Bisection, Regula-falsi, Secant and Newton-Raphson methods, Solution of Linear simultaneous, linear algebraic equations by Gauss Elimination Gauss-Jordan and Gauss-Siedel iteration method.

UNIT – II

Empirical laws, Curve Fitting & Interpolation Curve fitting linear and non-linear regression analysis (Method of group average and Least squares) Finite differences, Backward, forward and central difference relation and their use in Numerical differentiation and integration and their application in interpolation.

UNIT – III

Numerical Solution of Ordinary Differential Equations Numerical integration by Trapezoidal rule, Simpson's (1/3rd & 3/8th) rule and its error estimation. Application of difference relations in the solution of partial differential equations. Application of difference relations in the solution of partial differential equations. Numerical solution of ordinary differential equations by Taylor's series, Euler, Modified Euler, Runge-Kutta and Predictor-Corrector method.

UNIT – IV

Numerical Solutions of Partial Differential Equations Introduction, Classification of second order equations, Finite difference approximations to partial derivatives, Elliptic equations.

UNIT-V

Solution of Laplace equation, solution of Poisson's equation, Solution of Poisson's equation, Solution of elliptic equations by relaxation method, Parabolic equations, Solution of one-dimensional heat equation, Solution of two-dimensional heat equation, Solution of two-dimensional heat equation, Hyperbolic equations, solution of wave equation.

TEXT BOOKS

1. Numerical Methods in Engineering & Science – Dr. B.S. Grewal – Khanna Publishers, 6th Edn. 2004
2. Numerical Methods – P. Kandasamy, K. Thilagavathy & K. Gunavathy – S. Chand & Co., 2nd Rev. Edn. – 2003

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT-FLUID MECHANICS AND MACHINERY
CODE- BT411

UNIT I

Properties of fluid

Fluid,-ideal and real fluid, properties of fluid, mass density, weight density, specific volume, specific gravity, viscosity, surface tension, capillarity, vapour pressure, compressibility and bulk modulus. Newtonian and non-Newtonian fluids

Fluid Statics

Pressure, Pascal's law, hydrostatic law, pressure measurement, hydrostatic force on submerged plane and curved surface, Buoyancy.

UNIT – II

Fluid Kinematics

Description of fluid motion, Lagrangian and Eulerian approach, Type of fluid flow, Type of flow lines-path line, streak line, stream line, stream tube. Continuity equation, acceleration of a fluid particle, motion of fluid particle along curved path, Normal and tangential acceleration, Rotational flow, Rotation and Vorticity, circulation, stream and potential function.

Fluid Dynamics

Bernoulli's equation and its practical application, Venturimeter, Orifice meter, Nozzle , Pitot tube. Impulse momentum equation, Momentum of Momentum equation. Vortex flow.

UNIT – III

Laminar Flow

Reynolds's experiment, shear stress and pressure gradient relationship, flow of viscous fluids in circular pipe and between two parallel plates.

Boundary Layer Theory

Boundary layer definition and characteristics, momentum equation, Laminar and turbulent, boundary Layer, Total drag, separation and control.

UNIT – IV

Impulse Turbine

Classification of turbine, impulse turbine, Pelton wheel, Construction working, work done, head efficiency and Cavitations in turbines Design aspects, governing of impulse turbine.

Reaction Turbine

Radial flow reaction turbine, Francis turbine: construction, working, work done, efficiency, design aspect, advantages& disadvantages over pelton wheel.

UNIT-V

Axial flow reaction turbine

Propeller and Kaplan turbine, draft tube, specific speed, unit quantities, cavitations, degree of reaction, performance characteristics, surge tanks, governing of reaction turbine.

Centrifugal Pumps

Classification of Pumps-Centrifugal pump, Construction, working, work done, heads, efficiencies, multistage centrifugal pump, pump in series and parallel, specific speed, characteristic, net positive suction head, cavitations.

TEXT BOOKS

1. Mechanics of Fluids by Massey BS; Van Nostrand Reinhold Co
2. Fluid Mechanics by Douglas JF, Gasiorek JM, Swaffield JP; Poitman
3. Fluid Mechanics by Streetes VL and Wylie EB; Mcgraw Hill Book Co
4. Introduction to Fluid Mechanics and Fluid Machines – S.K. Som & G. Biswas – TMH
5. A text of Fluid Mechanics – R. K. Rajput – S. Chand & Company Ltd.

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT - MECHANICS OF SOLID-II
CODE –BT412

UNIT-I

Energy Methods:

Introduction, principles of superposition, strain energy, reciprocal relations, Maxwell Betti theorem, elastic strain energy relation in tension and compression, strain energy in beams subjected to bending and shaft to torsion. impact loading in tension and bending, first theorem of Castigliano and its applications

UNIT- II

Fixed Beams

Fixed beam subjected to different types of loads and couples, calculations of fixing moments and reactions at supports, deflection, effect of sinking of support.

Continuous beams

Continuous beams subjected to different type of loads and couples, beams with overhang, beams with one end fixed, Clapeyron's theorem, effect of sinking of supports

UNIT-III

Bending of curved bars

Bending of curved bars in plane of loading, Winkler Bech theory, crane hooks, chain links, bending of curved beams built in its initial plane, bending of circular bars subjected to symmetric loading, bending of circular rings, stresses in circular rings

UNIT-IV

Unsymmetrical Bending

Introduction to unsymmetrical bending, stresses due to unsymmetrical bending, deflection of beam due to unsymmetrical bending, shear center for angle, channel, and I-sections

Columns

Short Column (Strut), Eccentric loading on Strut, Stability of columns, Euler's formula for different end conditions, equivalent load, eccentric loading, Rankine's formula.

UNIT – V

Pressure Vessels

Thin Pressure Vessels circumferential and longitudinal stresses in thin cylindrical shells and thin spherical shell under internal pressure, Stresses in thick and compound cylinders.

TEXT BOOKS

1. Strength of Material – Dr. Sadhu Singh – Khanna Publishers
2. Elements of Strength of Material – Timo Shenko & Young – EWP Press
3. Strength of Material – R.K. Rajput – Dhanpat Rai & Sons

REFERENCE BOOKS

1. Strength of Material – Rider – ELBS
2. Mechanics of Material – F.P. Bear & E.E. Johnston – McGraw Hill
3. Mechanics of Material – J.M. Gera & Time Shenko – CBS Publishers
4. Introduction to Solid Mechanics – I. H. Shames – PHI
5. Engineering Mechanics of Solids – E.P. Popov – PHI
6. Strength of Material – Shaums Outline Series – McGraw Hill

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT-MECHANICS OF MACHINES
CODE-BT413

UNIT- I

Relative Velocity

Elements, pairs, mechanisms, four bar chain and its inversions, Slider crank chain, velocity diagrams, Relative velocity method, velocity diagrams of four bar chain and slider crank mechanisms. **Relative Acceleration** Relative acceleration diagram, acceleration diagram of four bar chain and slider crank mechanism.

UNIT - II

Cams:

Classification of cams and followers, nomenclature of a radial cam, description of follower movement, displacement diagrams, uniform and modified uniform motion, simple harmonic motion, uniform acceleration motion and its modifications, cycloidal motion.

Friction

Friction in turning pairs, application of friction circles in slider crank and four bar mechanisms; pivot and collar friction, thrust bearings.

UNIT- III

Gear and gear trains

Gear terminology, law of gearing, gear tooth forms, standard involute and cycloid tooth profile, interference and undercutting of involute teeth, minimum number of teeth on pinion to avoid interference, types of gears

Gear trains

Simple, compound, reverted, and epicyclical gear trains, tabular/analytical/graphical/vector method for computation of velocity ratio in gear trains.

Turning Moment & Flywheel

Turning moment on crankshaft, Turning moment diagrams-single cylinder double acting steam engine, four stroke IC engine and multi-cylinder steam engine, Fluctuation of energy, Flywheel

UNIT IV

Balancing of Machines

Static and dynamic balancing, Balancing of several masses in the same plane and different planes, Balancing of reciprocating masses, Balancing of primary force in reciprocating engine, Partial balancing of two cylinder locomotives, Variation of tractive force, swaying couple, hammer blow

Governors

Terminology, Centrifugal governors-Watt governor, Dead weight governors-Porter & Proell governor, Spring controlled governor-Hartnell governor, Sensitivity, Stability, Hunting, Isochronism, Effort and Power of governor, Controlling force diagrams for Porter governor and Spring controlled governors

UNIT V

Gyroscopic Motion

Principles, Gyroscopic torque, Effect of gyroscopic couple on the stability of aero planes & automobiles

Mechanical Vibrations

Types of vibrations, Degrees of freedom, Single degree free & damped vibrations, Forced vibration of single degree system under harmonic excitation, Critical speeds of shaft

MATS UNIVERSITY
SEMESTER – IV
BRANCH – MECHANICAL
SUBJECT-MANUFACTURING TECHNOLOGY
CODE – BT414

UNIT – I

Introduction to Manufacturing Processes:

Importance of manufacturing processes, classification, economic and technological definitions of manufacturing processes. **Foundry Pattern making** - Types, material, allowances, colour codes, core – types, materials and its properties. **Mould Making** - Types of sand moulding, design considerations, moulding machines & moulding procedure, moulding sand – types, properties, composition and applications. **Casting** - Procedure, Melting furnaces, casting defects. **Special Casting Processes** - Investment casting, centrifugal casting, shell moulding, CO₂ moulding, slush casting, die casting.

UNIT – II

Welding

Principles of Welding, survey and allied processes. **Arc Welding** Power Source and Consumable, MMAW, TIG and MIG processes and their parameter selection, atomic hydrogen welding, welding of cast iron, welding electrode – types, composition, specification.

Resistance Welding Principle, equipment and processes. Thermit Welding, brazing & soldering, Internal and external welding defects, Inspection & testing of weld.

UNIT – III

Powder Metallurgy

Powder Manufacturing, compacting and sintering processes, Advantages, limitations and applications of powder metallurgy .

Manufacturing of Plastic Components

Advantages, application and principle of the following processes, extrusion, injection moulding compression moulding, transfer moulding, blow moulding .

UNIT – IV

Forging - Principle, types, tools and fixture of forging, forging dies, forging machines, forging design, drop forging die design ,upset forging die design, forging practice and process capability, forging defects, Inspection and testing of forged parts.

Extrusion

Principle, extrusion processes, process parameters, extrusion equipment, extrusion defects.

Rolling - Principle, classification of rolled products, types of rolling, rolling mill train components, roll pass design for continuous mill.

UNIT-V

Drawing

Wire drawing, tube drawing: Principle, setup, type, process capability.

Press Working - Types of presses, selection of press, components of a simple press, press working operations – shear, bending, drawing etc., types of dies, die sets, considerations in die design, scrap strip layout.

Unconventional Machining - Advantages, application and limitation, survey of Non-conventional machining processes, mechanics of metal removal, tooling, equipment, process parameters and surface finish obtained & specific application of following processes - EDM, ECM, USM, AJM, EBM and LBM.

TEXT BOOKS

1. Manufacturing Technology (Vol. – I & II) – P.N. Rao – Tata McGraw Hill Pub. Company, New Delhi
2. A Text Book of Production Technology(Manufacturing Processes) – P.C. Sharma – S. Chand and Company Ltd., New Delhi
3. Manufacturing Science – A. Ghosh & A.K. Mallik – East West Press Pvt. Ltd., New Delhi
4. Production Technology – R.K. Jain – Khanna Publishers, New Delhi

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT-FLUID MECHANICS AND MACHINERY LAB
CODE- BT416

EXPERIMENTS TO BE PERFORMED (MINIMUM TEN NUMBERS)

1. To determine the meta-centric height of a ship model.
2. To verify Bernoulli's Theorem.
3. To verify Impulse Momentum Principle.
4. To calibrate a Venturimeter and study the variation of coefficient of discharge.
5. To calibrate an orifice-meter.
6. Performance characteristics of Pelton wheel turbine.
7. Performance characteristics of Francis turbine.
8. Performance characteristics of Kaplan turbine.
9. Performance characteristics of variable speed centrifugal pump.
10. Performance characteristics of rated speed centrifugal pump.
11. Performance characteristics of multistage centrifugal pump.

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Apparatus for determination of metacentric height
2. Bernoulli's apparatus
3. Impact of jet apparatus
4. Venturimeter
5. Orificemeter
6. Pelton Wheel Turbine
7. Francis Turbine Test Rig
8. Kaplan Turbine Test Rig
9. Variable Speed Centrifugal Pump Test Rig
10. Rated Speed Centrifugal Pump Test Rig
11. Multi Stage Centrifugal Pump Test Rig

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT-MECHANICS OF MACHINES LAB
CODE BT417

EXPERIMENTS TO BE PERFORMED (MINIMUM TEN EXPERIMENTS)

1. To find out the oscillations of simple pendulum with universal vibration apparatus.
2. To find out the oscillations of Compound pendulum with universal vibration apparatus.
3. To find out the radius of gyration of bi-filler suspension with universal vibration apparatus.
4. To find out undamped torsional vibrations of single rotor system with universal vibration apparatus..
5. To find out the frequency of damped torsional vibration of single rotor system with universal vibration vibration apparatus.
6. To measure the frequency of torsional vibrations of single rotor system with universal vibration apparatus.
7. To measure the frequency of torsional vibrations of double rotor system with universal vibration apparatus.
8. To find out free vibration of helical coiled spring with universal vibration apparatus.
9. To study forced damped vibration of a spring mass system and simple supported beam with universal vibration apparatus.
10. To find out the Gyroscopic couple and prove the Gyroscopic law with Gyroscope apparatus.
11. To find out the Power and effort of Proel, Porter & Hartnell Governor with Governor Apparatus.
12. To find out the critical speed for different diameters of shaft by whirling of shaft apparatus.
13. To verify the static and dynamic balancing for different planes and masses by balancing apparatus.

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Universal Vibration Apparatus
2. Whirling Of Shaft Apparatus.
3. Balancing Apparatus (Both Static & Dynamic)
4. Epicyclic Gear Train And Holding Torque Apparatus
5. Gyroscope apparatus
6. Governor apparatus with differential attachments

MATS UNIVERSITY
SEMESTER – IV
BRANCH – MECHANICAL
SUBJECT- MANUFACTURING TECHNOLOGY LAB
CODE –BT418

Say min 10 experiments out of the following (Or such experiment along with study of the machines/processes)

1. Shear-angle determination (using formula) with tube cutting (for orthogonal) on lathe machine.
2. Bolt (thread) making on Lathe machine
3. Tool grinding (to provide tool angles) on tool-grinder machine.
4. Gear cutting on milling machine.
5. Machining a block on shaper machine.
6. Finishing of a surface on surface-grinding machine.
7. Drilling holes on drilling machine and study of twist-drill.
8. Study of different types of tools and its angles & materials.
9. Experiment on tool wear and tool life.
10. Experiment on jigs/Fixtures and its uses
11. Resistance welding experiment.
12. Experiment on unconventional machining.
13. Experiment on unconventional welding.
14. Experiment on TIG/MIG Welding.
15. Macro and Microstructure of welding joints, HAZ.

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT-MATERIAL TESTING LAB
CODE BT419

EXPERIMENTS TO BE PERFORMED (MINIMUM TEN NUMBERS)

1. To study the Universal Testing Machine.
2. To perform the Tensile Test of Mild Steel on U.T.M and To Draw Stress–Strain Curve.
3. To determine strength of wood on U.T.M (i) Along the Grain (ii) Across the Grain.
4. To determine shear strength of Mild Steel on U.T.M.
5. To observe Flexural Behavior of Timber specimen and to determine it's strength under transverse loading on U.T.M.
6. To study the Impact Testing Machine and test specimen of Izod and Charpy.
7. To determine Izod and Charpy Value of the given mild steel specimen.
8. To study the Fatigue Testing Machine and to discuss the procedure to find out endurance limit of given material.
9. To study the Spring Testing Machine.
10. To determine modulus of rigidity for the material of open and closed Coiled Helical Spring Subjected to Axial Load by spring testing machine.
11. To study the Torsion Testing Machine
12. To determine ultimate shear stress and modulus of rigidity under Torsion.
13. To study the Cupping Test Machine and to determine Erichsen value of Mild Steel sheet.
14. To study the Rockwell Hardness Testing Machine and to determine the Rockwell Hardness of the given material.
15. To study the Brinell Hardness Machine and to determine the Brinell hardness of the given material.
16. To study the Vickers Hardness Machine and to conduct a test on the machine.
17. Buckling of column

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Universal Testing Machine
2. Impact Testing Machine
3. Fatigue Testing Machine
4. Spring Testing Machine
5. Torsion Testing Machine
6. Cupping Testing Machine
7. Rockwell Hardness Testing Machine
8. Brinell Hardness Machine
9. Vickers Hardness Machine
10. Column Testing Machine

MATS UNIVERSITY
SEMESTER – IV
BRANCH – MECHANICAL
SUBJECT - Engineering Risk–Benefit Analysis
CODE - BT4151

UNIT 1:

Introduction- Knowledge and Ignorance, Information Uncertainty in Engineering Systems, Introduction and overview of class; definition of Engineering risk; overview of Engineering risk analysis. Risk Methods: Risk Terminology, Risk Assessment, Risk Management 63 and Control, Risk Acceptance, Risk Communication, Identifying and structuring the Engineering risk problem; developing a deterministic or parametric model

UNIT 2:

System Definition and Structure: System Definition Models, Hierarchical Definitions of Systems, System Complexity. Reliability Assessment: Analytical Reliability Assessment, Empirical Reliability Analysis Using Life Data, Reliability Analysis of Systems

UNIT 3:

Consequence Assessment-Types, Cause-Consequence Diagrams, Microeconomic Modeling, Value of Human Life, Flood Damages, and Consequence Propagation. Engineering Economics: Time Value of Money, Interest Models, Equivalence

UNIT 4:

Decision Analysis: Risk Aversion, Risk Homeostasis, Influence Diagrams and Decision Trees, Discounting Procedures, Decision Criteria, Tradeoff Analysis, Repair and Maintenance Issues, Maintainability Analysis, Repair Analysis, Warranty Analysis, Insurance Models

UNIT 5:

Data Needs for Risk Studies: Elicitation Methods of Expert Opinions, Guidance

Text Books:

1. Risk Analysis in Engineering and Economics, B. M. Ayyub, Chapman-Hall/CRC Press, 2003.
2. Probability, Statistics, and Reliability for Engineers and Scientists, Ayyub & McCuen, 2003.
3. Probabilistic Risk Assessment and Management for Engineers and Scientists, by H. Kumamoto and E. J. Henley, Second Edition, IEEE Press, NY, 1996.
4. Bedford, T. and Cooke, R. Probabilistic Risk Analysis: Foundations and Methods. New York: Cambridge University Press, 2001.
5. Normal Accidents, Living with High-Risk Technologies, C. Perrow, Princeton University Press, 1999.

6. Accident Precursor Analysis and Management - Reducing Technological Risk Through Diligence, National Academy of Engineering, the National Academies Press, Washington, DC, 2004.

MATS UNIVERSITY
SEMESTER – V
BRANCH – MECHANICAL
SUBJECT - Disaster Management
CODE - BT4152

UNIT 1:

Introduction- Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation.

UNIT 2:

Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

UNIT 3:

Disaster impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate-change and urban disasters.

UNIT 4:

Disaster Risk Reduction (DRR), Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT 5:

Disasters, Environment and Development, Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental-friendly recovery; reconstruction and development methods.

Text/Reference Books:

1. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
2. Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.
3. Ghosh G.K., 2006, Disaster Management ,APH Publishing Corporation.

MATS UNIVERSITY
SEMESTER – V
BRANCH – MECHANICAL
SUBJECT - Global Strategy and Technology
CODE - BT4153

UNIT 1:

Introduction to Global Strategy- What the motivations to expand abroad are and how firms can manage conflicting demands in terms of global integration, local responsiveness and worldwide learning. How Global are we? How global most MNCs are? The End of Corporate Capitalism Beyond Off shoring Distance Still Matters Going International.

UNIT 2:

Location and Global Strategy: Home-Country Effects: Shifting global leadership in the watch industry Success of Swatch as a company in this industry Potential threat on the horizon that could once again cause the decline of the Swiss watch industry. Distance and Global Strategy: Host Country Choices: The Globalization of CEMEX The benefits that CEMEX has derived from expanding across borders Challenges that CEMEX is likely to confront in the future How far can Cemex's competitive advantage travel.

UNIT 3:

International Corporate Governance: International Corporate Governance with Chinese Characteristics Corporate governance matters in China's capital market Corporate governance model in China differ from international standards Special problems associated with Petro China's corporate governance model Conditions required for further reforms in Petro China's corporate governance system. Cross-cultural Negotiation: Learn from the MOUSE negotiation Issues/factors affect positively or negatively & the negotiation outcome Issues crucial in aligning different parties interests. Negotiators attitudes and culture in reaching the agreement

UNIT 4:

Technology: Productivity and Diffusion: Productivity Impact and Managing Diffusion Science, Technology and Productivity. Technology, Markets and Competition Incumbents and Entrants Commercialization Intellectual Property and Complementary Assets.

UNIT 5:

Investing in R&D Capabilities: Incentives to Innovate Investing in basic/applied research; Real options and other approaches. Applying the Concepts and Frameworks: R&D Investment Decisions: Applying the NPV, Real Options and Scenario-Planning Frameworks.

Text/Reference Books:

1. Ghemawat & Hout (2008) Tomorrow's Global Giants? Not the Usual Suspects, HBR Michael E. Porter, "The Competitive Advantage of Nations" HBR, 1990.
2. Larker and Tayan, "Models of Corporate Governance: Who's the Fairest of them all?" Stanford Business School Case, 2008, CG11.
3. Aguilera, R. V. (2005) "Corporate Governance" In J. Beckert and M. Zafirovski, International Encyclopedia of Economic Sociology. London: Rutledge.

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT-PROJECT MANAGEMENT
CODE- BT4154

UNIT-I

Introduction to Project management: Characteristics of projects, Definition and objectives of Project Management, Stages of Project Management, Project Planning Process, Establishing Project organization.

UNIT-II

Work definition: Defining work content, Time Estimation Method, Project Cost Estimation and budgeting, Project Risk Management, Project scheduling and Planning Tools: Work Breakdown structure, LRC, Gantt charts, CPM/PERT Networks.

UNIT-III

Developing Project Plan (Baseline), Project cash flow analysis, Project scheduling with resource constraints: Resource Leveling and Resource Allocation. Time Cost Trade off: Crashing Heuristic.

UNIT-IV

Project Implementation: Project Monitoring and Control with PERT/Cost, Computers applications in Project Management, Contract Management and Project Procurement Management.

UNIT-V

Post-Project analysis.

Text Books:

1. Shtub, Bard and Globerson, Project Management: Engineering, Technology, and Implementation, Prentice Hall, India
2. Lock, Gower, Project Management Handbook.
3. Cleland and King, VNR Project Management Handbook.
4. Wiest and Levy, Management guide to PERT/CPM, Prentice Hall. India
5. Horald Kerzner, Project Management: A Systemic Approach to Planning, Scheduling and Controlling, CBS Publishers, 2002.
6. S. Choudhury, Project Scheduling and Monitoring in Practice.
7. P. K. Joy, Total Project Management: The Indian Context, Macmillan India Ltd.

MATS UNIVERSITY
SEMESTER –IV
BRANCH – MECHANICAL
SUBJECT- Software Engineering
CODE- BT4155

UNIT 1:

Introduction- notion of software as a product – characteristics of a good software product. Engineering aspects of software production – necessity of automation. Job responsibilities of programmers and software engineers as software developers.

UNIT 2:

Process Models and Program Design Techniques- Software Development Process Models – Code & Fix model, Waterfall model, Incremental model, Rapid Prototyping model, Spiral (Evolutionary) model. Good Program Design Techniques – Structured Programming, Coupling and Cohesion, Abstraction and Information Hiding, Automated Programming, Defensive Programming, Redundant Programming, Aesthetics. Software Modelling Tools – Data flow Diagrams, UML and XML. Jackson System Development.

UNIT 3:

Verification and Validation: Testing of Software Products – Black-Box Testing and White-Box Testing, Static Analysis, Symbolic Execution and Control Flow Graphs – Cyclomatic Complexity. Introduction to testing of Real-time Software Systems.

UNIT 4:

Software Project Management: Management Functions and Processes, Project Planning and Control, Organization and Intra-team Communication, Risk Management. Software Cost Estimation – underlying factors of critical concern. Metrics for estimating costs of software products – Function Points. Techniques for software cost estimation – Expert judgement, Delphi cost estimation, Work break-down structure and Process break-down structure, COCOMO and COCOMO-II.

UNIT 5:

Advanced Topics: Formal Methods in Software Engineering – Z notation, Hoare’s notation. Formalization of Functional Specifications – SPEC. Support environment for Development of Software Products. Representative Tools for Editors, Linkers, Interpreters, Code Generators, Debuggers. Tools for Decision Support and Synthesis, Configuration control and Engineering Databases, Project Management. Petrinets. Introduction to Design Patterns, Aspectoriented Programming.

Text Books:

1. Fundamentals of Software Engineering – Carlo Ghezzi et. al.
2. Software Engineering – Design, Reliability Management – Pressman.

3. Software Engineering – Ian Sommerville.
4. Software Engineering - Shoeman.
5. Software Engineering with Abstraction – Berzins and Luqi