

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Industrial Production Engineering, VIII-Semester

IP-8001 Supply Chain Management

COURSECONTENT:

UNIT 1 Introduction to SCM: Definition, elements of supply chain, building blocks of supply chain network, drivers of supply chain, Decision making in supply chain, Decision making models, supply chain performance measurement.

UNIT2 Demand management in supply chain: Demand planning and forecasting, types of demand, Forecasting methods, aggregate planning, Economic Order Quantity models and Reorder Point models, Inventory optimization in supply chain.

UNIT 3 Mathematical foundations of Supply chain Solutions: Stochastic models and Optimization techniques in Supply Chain Planning, Facility layout, capacity planning, routing and scheduling in supply chain, determining optimal levels of product availability.

UNIT 4 Logistic Management: Definition, Elements of logistics management, Organization for logistics function, Logistics function integration, logistic function performance measurement, distribution and distribution strategies, integrated logistics and business logistics, customer orientation and relationship management.

UNIT 5 Transportation, Network design and Information Technology: Transportation fundamentals, Decisions in transportation, Network design in supply chain, Information Technology for supply chain management, Coordination, E-business, E-procurement, E-logistics, E-markets, Internet auctions, E-business process optimization.

TEXT BOOKS RECOMMENDED:

- 1 Chopra, S. and P. Meindl, SupplyChain Management: StrategyPlanning and Operation, (4th ed.),
- 2 PrenticeHall, Upper Saddle River, NJ, USA 2010.(Textbook)
- 3 Christopher, M.Logistics andsupplychain management: strategies forreducing cost and improving service (3rd ed.).London: FT Press, UK, 2005.

REFERENCE BOOKS RECOMMENDED:

- 1 Bowersox D.J., ClossD.J. and Helferich O.K.,Logistical Management,McGraw-HillCollege,UK

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Industrial Production Engineering, VIII-Semester

IP-8002 Tool Engineering and Design of Tools Machine

COURSECONTENT:

UNIT 1. Tooling classification, material, properties and application, General design considerations. Design of single point cutting tool for strength & rigidity, Design for optimum geometry, Design strategies for H.S.S. Carbide and Ceramic, Chip Breakers, Design of form tool. Design of drill, and milling cutters

UNIT 2. Design of Metal Working Tools: Design of elements of press working tool dies and dieset, concept of center of pressure, compound dies, progressive dies, Combination dies, bending, forming dies, press tonnage and its calculations.

UNIT 3. Tooling for forging and rolling –Design principles for forging dies, drop forging, upset forging, Design principles and practice for rolling, roll pass design.

UNIT 4. Design of Jig and Fixtures: Economics of jigs and fixture, principle of location and clamping, Drilling Bushes, Design of various jigs and fixtures, such as Drilling jig, milling fixture, Assembly fixture, Welding fixtures.

UNIT 5. Dies and Mould Design for Plastics and rubber Parts: Compression moulding, transfer moulding, blow moulding.

PRACTICALS:LIST OF EXPERIMENTS:

1. Study of various locating devices
2. Study of various clamping devices
3. Study of tool guiding elements
4. Study of Drill jigs
5. Study of Milling fixture
6. To design a single point cutting tool for the turning of given bar
7. To design a drill jig for the given component
8. To design a form tool.

TEXT BOOKS RECOMMENDED:

- 1 Machine Tools Handbook: Design and Operation, Prakash Hiralal Joshi, DME, AMIE (India)
- 2 Fundamentals of Tool Design, David Spitler, Jeff Lantrip, John Nee, David A Smith, Society of Manufacturing Engineers; 5th Edition

REFERENCE BOOKS RECOMMENDED:

- 1 Eeryand Johnson, Process Engineering, PrenticeHall, NJ, USA

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Industrial Production Engineering, VIII-Semester

Elective –V IP-8003 (1) Ergonomics

COURSECONTENT:

UNIT 1 .Introduction: Definition, History of Development, Characteristics of Man Machine Systems, Relative capabilities of Human beings and Machines,

UNIT 2. Information Input and Processing: Introduction to information theory, Factors affecting information reception and processing. Coding and Selection of sensory inputs. Human Sensory Process: Vision, Hearing, Cutaneous, Kinesthetics, and orientation senses.

UNIT 3.Display: Visual Display: Quantitative and qualitative types of visual display, Visual indicators and warning signals, pictorial and Graphic displays, Alphanumeric Characteristics, Symbolic Codes.

Auditory and Textual Display: General Principles, Characteristics and Selection of Auditory and Textual display.

UNIT 4.Human Motor Activities : Bio-mechanisms of motion, Measurement of Physiological Functions, Energy Expenditure in Physical Activities. Human Control of Systems: Human input and output channels. Compatibility, Tracking Operations, Design of Control Anthropometry: Anthropometrics Data and their uses, Work Space Dimensions. Design of seats and seating Arrangement, Location of components, Design of work place.

UNIT 5.Environment and Safety: Introduction to Environmental stresses and their impacts on human work. Industrial Safety: Analysis of cost of accidents, Hazards in various fields like Fire, Electrical shocks

TEXT BOOKS RECOMMENDED:

- 1 McCormick, Human Factors in Engineering and Design, 7thEd,ISBN-13: 978-0070549012, McGraw HillNY, USA.
- 2 Singleton,Introduction to Ergonomics:WorldHealth Organization, Geneva.

REFERENCE BOOKS:

- 1 Grandjean,fitting task to the men, Tata McGraw Hill Co., New Delhi

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Credit Based Grading System

Industrial Production Engineering, VIII-Semester

Elective –V IP-8003 (2) Principles and Practices of Management

COURSECONTENT:

UNIT 1.Introduction: Origin of management concept, Management process. Principles related to organization: Organization, its role and importance, Theories of organization, Departmentation, Delegation, Span of control, line and staff relationship, Shaping overall structure.

UNIT 2.Personnel Management: Role and functions of personnel management, Organization of personnel dept., Personnel problems and their solution welfare techniques. Manpower Selection and Development: Sources of recruitment, Selection methods, Interviewing and testing, Training methods, Performance appraisal and its methods.

UNIT 3. Motivation and Leadership: Need analysis, theories of motivation, Integrating pay, need and organization, Wage curve, Salary structure and number of grades, Merit Rating.

UNIT 4. Job Evaluation: Purpose, Various types of job evaluation systems and their applications, Job classification, Wage curve, Salary structure and number of grades, Merit Rating.

UNIT 5. Employee-Employer Relations and Labour Legislation: Employee-Employer relations, Industrial conflicts, conciliation, Arbitration, Adjudication, Collective Bargaining, Strikes and lockouts, Grievances, Procedures, Trade Unions and their functions. Principles and practices of labour legislation.

TEXT BOOKS RECOMMENDED:

- 1 Koontz H. and O'Donnel H., *Essential of Management*, 8th ed., McGraw-Hill, New Delhi, 2009.
- 2 Robbins, S. *Fundamentals of Management*. 5th ed., Pearson Education, Canada, 2008.
- 3 Terry & Franklin, *Principles of Management*, Richard – Erwin.

REFERENCE BOOKS RECOMMENDED:

- 1 Prasad L M, *Principles and Practices of Management*, S. Chand and Sons, New Delhi

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Industrial Production Engineering, VIII-Semester

Elective –V IP-8003 (3) Total Quality Management

COURSE CONTENTS

UNIT 1 Evolution of Total Quality Management, Historical perspective. People involvement, Teamwork, Discipline, Supplier involvement, defining the immediate customer, Quality at source.

UNIT 2 Elements of TQM: Total employee involvement, Elimination of Waste and problem exposure, Total Quality Control Systems, SPC and ISO 9000, Demings wheel, Deming 14 points-Pros and Cons in Industrial Engineering context. Philip Crosby Philosophy, Ishikawa Diagram. Just-in-time philosophy, Design and Development strategy in TQM, Quality function development.

UNIT 3 Just-in-time Management: Problems of queues, Tenets of JIT. Load smoothing, Push vs pull method of production, Set up time reduction.

UNIT 4 Total Productive maintenance (TPM), Kaizen and continual improvement, Cost benefit analysis, Life cycle costing.

UNIT 5 Application of TQM to service type organizations, Service guarantees, case studies on application of TQM to service type organization, Various quality awards, cost benefit analysis, Life cycle costing.

TEXT BOOKS RECOMMENDED:

1. D. D. Shanna, TQM, Sultanchand
2. Chitale and Jain, TQM & ISO -9000

REFERENCES RECOMMENDED:

1. Juran J M, Quality Planning and Analysis

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Industrial Production Engineering, VIII-Semester

Elective –V IP-8003 (4) Enterprise Resource Planning And Mis

COURSE CONTENTS:

UNIT 1 Introduction to Information, Importance of Information, Characteristics of Information, Taxonomy of Information, Measurement of Information, Integrated Information System, Information Resource Management, search, storage and measurement of information.

UNIT 2 Introduction to M18, M15 definitions, Evolutionary Stages of M18, M18 components, MIS Model, MIS concepts, Management concept of M18, System concept of M15, approaches to MIS, System approach, Management approach, subsystem approach, production, marketing, finance and personnel subsystems of M18, Database Perspective of M15.

UNIT 3 Introduction to Computer Based Information Systems (CBIS), Importance and Characteristics of CBIS, Role of C.B.I.S. In Management , Transaction Processing System (TPS), Decision Support System (DSS), Group Decision Support System(GDSS), Executive Support System (ESS), Knowledge Work System (KWS).

UNIT 4 Evolutionary stages of Enterprise Resource Planning(ERP), Need for ERP, Variety accommodation, Strategic and operational issues in ERP, Integrated and Business model of ERP, Zachmann enterprise architecture, MRP and MRP-II.

UNIT 5. Introduction to Business Process Re-Engineering, ERP Implementation: Role of consultants, vendors and users, Guidelines and Procedure for ERP implementation, strategic advantage through ERP, ERP Domain.

TEXT BOOKS RECOMMENDED:

- 1 Chhabra, Abuja & Jain, Planning Men at Work.
- 2 Enterprise Resource Planning, Concept and Practice Garg V.K.
Venkitkrishnan N.K., PHI
- 3 Business Process Re-Engineering, Jayaraman, , TMH.
- 4 ERP by Alexis Leon
- 5 Kanter, Management Information System, PHI

REFERENCES RECOMMENDED:

- 1 Murdick& Ross, Management Information System, PHI.
- 2 James A. O'brion, Management Information Systems, TMH
- 3 Alan Simpson, D. Base -III .

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Industrial Production Engineering, VIII-Semester

Elective –VI IP-8004 (1) Plastic Engineering And Composites

COURSECONTENT:

UNIT 1 Introduction: Introduction to polymers classification of polymers -

(a) Elastomers, (b) Fibre forming. Rheology of polymeric materials.

Chemistry of Polymerisation :

(i) Chain Polymerisation (ii) Step Polymerization (iii) Miscellaneous Polymerization reactions (iv) Co-Polymerization.

Chemical & Geometrical Structure of polymer molecules:

(i) General introduction of polymer microstructure (ii) Microstructure based on the chemical structure (iii) Microstructure based on the geometric structure.

Properties of Plastics as an Engineering Material:

(i) Comparison of metals & plastics (ii) Mechanical properties of plastics (iii) Thermal properties of plastics.

UNIT 2 Production Processes of Plastics :

(a) Press Moulding of Plastics -Compression moulding, moulding of thermostats and thermoplasts:

(i) Product design of Press Moulding.

(ii) Product design of Compression Moulding.

(b) Injection Moulding: (i) Injection moulding process (ii) Influence of material properties on moulding (iii) Design of nozzle, runners & gates (iv) Product design for injection moulding.

(c) Extrusion : (i) Extrusion operations (ii) The extruder screw, the barrel, profile dies, breaker plate and screen pack, cooling & take-off equipment (iii) Manufacture of sheet and film (iv) Wire coating.

(d) Blow Moulding: (i) Blow moulding principle, Production of parison, material characteristics in blow moulding (ii) Rotational moulding (iii) Expandable polystyrene moulding.

(e) Thermoforming methods: Various types of vacuum forming methods.

(f) Powder coating.

UNIT 3 Joining of Plastics:

(i) Adhesives, cement and solvent bonding.

(ii) Welding of plastics - by hot gas, hot wire, induction and ultrasonic.

UNIT 4 Machining, Finishing & Decorating of Plastics:

(i) Effect of properties on machining in turning, drilling etc.

(ii) Abrasive finishing, barrel finishing and Buffing.

(iii) Decorating: Silk Screen, electroplating and vacuum metalizing.

UNIT 5 Composites :(i) Introduction to composites (ii) Open and Closed mould processes
(iii) Reinforcing fibres, Glass fibres (iv) The influence of reinforcing fibres on strength (v) Yarn designations (vi) Mats and fabrics.

TEXT BOOKS RECOMMENDED:

- 1 Govarikar V. R., Vishwanathan N. V., JayadevSreedhar, Polymer Science, Wiley Eastern Ltd., New Delhi
- 2 Akira Kobayashi, Machining of Plastics, McGraw Hill comp
- 3 William J. Patton, Plastic Technology Theory & Design & Manufacturing, Reston Publishing Comp. INC, A P.H. Comp.

REFERENCE BOOKS RECOMMENDED:

- 1 Miles D. C. &BristonJ. H., Polymer Technology, Chemical Publishing Comp.INC, New York.
- 2 Sidney Levy & Harry Van J, Plastic Product Design Engineering, Nostrand Reinhold Comp
- 3 Edward Miller, Plastics Products Design Hand Book Part A and B, Marcel Dekker INC, New York

Industrial Production Engineering, VIII-Semester

Elective –VI IP-8004 (2) Advanced Machining Processes

COURSECONTENT:

UNIT 1. Modern Machining Process: Introduction and classification. Abrasive Jet Machining: Fundamental principles, process parameters, Metal removal rate, effect of parameters, application & limitations. Ultrasonic Machining: Fundamental principles, process parameters, cutting tool design, tool feed mechanism, transducer, Design of velocity transformers, Mechanics of cutting, Effect of parameters, Economic considerations, application & limitations.

UNIT 2. Chemical Machining: Chemical milling, chemical engraving, chemical blanking, fundamental principles and process parameters. Electrochemical Machining: Classification, fundamental principles, elements of process, Metal removal rate, electro-chemistry of process, Dynamics and hydrodynamics of process, optimization analysis, choice of electrolytes. Electrochemical Grinding: Fundamental principles, electro-chemical and process parameters, electrochemical debarring and honing.

UNIT 3. Electrical Discharge Machining: Mechanisms of metal removal, Basic circuitry, Evaluation of metal removal rate, Machining accuracy, Surface finish, Analysis for optimization, tool material, dielectric fluid, application & limitation.

UNIT 4. Laser Beam Machining: Features, metal removal, thermal analysis, cutting speed and accuracy, application & limitation, Micro-drilling by laser. Electron Beam Machining: Theory, forces in machining, process capability. Plasma Arc Machining: Non-thermal generation of plasma, mechanics of metal removal, various parameters, accuracy and surface finish, applications.

UNIT 5. Plastics: Composition of plastic materials, Molding methods-Injection molding, compression molding, transfer molding, extrusion molding, Calendaring, Blow molding, Laminating & Reinforcing, Welding of plastics. Dies and Mold Design for Plastics and rubber Parts: Compression molding, transfer molding, blow molding.

TEXT BOOKS RECOMMENDED:

- 1 Pandey P. C. & Shan H.S., Modern Machining Process, Tata McGraw Hill
- 2 Dr. Bhattacharya Amitabh, New Technology, The Institution of Engineers Publication

REFERENCE BOOKS RECOMMENDED:

- 1 William J. Patton, Plastic Technology Theory, Design & Manufacturing, Reston Publishing Comp
- 2 V.K. Jain, Advanced Machining Processes, Allied Publishers

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Industrial Production Engineering, VIII-Semester

Elective –VI IP-8004 (3) Automobile Engineering

COURSE CONTENTS

UNIT 1 Vehicle Structure: Fine frame, integral body structure, engine, transmission and body structure mountings, sub-frames collision safety, type of rubber flexible mounting. Vehicle ride characteristics: human response, vehicle ride.

Handling System and Steering System: Study state handling characteristics and response to input Steering gear box fundamental design. Need for power steering, steering linkages ball and socket joints.

Suspension: Suspension geometry camber, Swivel & Castor angle. Suspension roll centres body roll stability. Antiroll stiffness. Rubber Spring pump or limiting stop. Axle location, front wheel drive, independent suspension, McPherson strut & rear wheel. Hotch kiss drive springs & shock absorber.

UNIT 2 Pneumatic Tyre: Mechanics of tyre forces, rolling resistance, tractive effort & step. Cornering properties 8: stiffness, Performance on roads. Tyre material & construction, Thread design & its marking identification brakes,

Braking fundamentals, Brake shoe & pad fundamentals brake 8: shoe expander & adjuster disc brakes. Dual brake system, anti locking brakes air operated power brakes.

UNIT 3 Friction Clutch: Clutch fundamentals, Angular driven plate, Cushioning & torsional damping, Friction material, clutch alignment, types of clutch diaphragm, multiplate etc., hydraulically operated automatic transmission clutch.

UNIT 4 Transmission: The necessity for 3 Gear box, five speed and reverse synchromesh, Gear box synchronization & engagement, remote controlled gear selection 8: engagement, splitter & range change gear box, over drive considerations setting gear ratios, Hydrokinetic fluid coupling 8t torque converter, final drive transmission, crown wheel 8: pinion axle adjustment, differential locks, skid reducing universal joint, four wheel drive & two wheel drive.

UNIT 5 Performance Characteristics of Road Vehicles: Tractive effort weight & axle loads, aerodynamics forces, vehicle power plant & transmission characteristics & its prediction operating fuel economy. Electrical System: Self starting mechanism 8: battery charging system, Lighting & wiring system for horn, lamp indicators etc. General: Air conditioning, auto-inspection motor vehicle acts, emission standard 8: its control.

TEXT BOOKS RECOMMENDED:

- 1 Wrong, Theory of ground vehicle.
- 2 Hinz, Advanced automobile.

REFERENCES RECOMMENDED

- 1 Newton steeds Garret, The motor vehicle.
- 2 Crouse/ Anglin, Automotive mechanics, TMH Edition, The series of judge, The modern motor Engg.

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Industrial Production Engineering, VIII-Semester

Elective –VI IP-8004 (4) Rapid Prototyping, And Reverse Engineering

COURSE CONTENTS

UNIT 1 Phases of Product Development, Problems in Product Development. Need for Rapid product development. Virtual Reality (VR), Introduction, Features used in VR, Technologies used in VR.

UNIT 2 Rapid Prototyping. Methods of Rapid prototyping. CAD to Rapid prototyping Process, STL format, Support structures, Classification of RP methods. Laminated Object Manufacturing (LOM), Approaches to LOM, Steps in LOM, LOM machine and process capability, Applications, Kira's LOM. Fused Deposition Modeling (FDM), principles, steps, machines and applications. Selective Laser Sintering (SLS), Principles, Operations, Machines, Materials and Applications. 3D Printing. Principles, Operations, Machines, Materials and Applications

UNIT 3. Selective Photocuring technologies: Selective Laser Scanning, Stereo Lithography Apparatus (SLA). Principle, Steps and post processing. SLA machines and process capability, Applications. Photocuring through Mask, Solid Ground Curing (SGC), Principle, Steps, Application and machines. SLA Quick CAST and its applications. '

UNIT 4 Emerging Techniques in RP: Shape Deposition Modeling, Contour Crafting, Droplet Deposition Method. Reverse Engineering, Approaches, CMM and its applications, Principle of Non-contact Measurement: Laser Scanner, Introduction to Photo grammetry.

UNIT 5 Rapid Tooling: Indirect methods, Silicon Rubber Molding, Epoxy Tooling Electroforming, Spray Metal Tooling, Cast Kirksite Tooling, 3D Keltool, Direct methods: 3D printing, SLS, Laminated Tooling, Hybrid Layer Manufacturing.

TEXT BOOKS RECOMMENDED:

- 1 Integrated Product Management, Andreasen MM, Hein L, IFS Publication
- 2 Automated Fabrication: Burns

REFERENCES RECOMMENDED:

- 1 Peter D. Hilton and Paul F. Jacobs (Ed), 2000, Rapid Tooling: Technologies and Industrial Applications, Marcel Dekker
- 2 Rapid Prototyping, Principles and Applications, 2nd Edition, C K Chua, K F Leong 8: C S Lim

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Industrial Production Engineering, VIII-Semester

IP-8005 Project P-II

COURSE CONTENTS:

Students undertake projects based on topics from industrial engineering, production management and/ or manufacturing. During this course students have to:

1. Work on the topic finalized in the phase I
2. Collect the relevant data and perform data analyze it
3. Derive results and conclusions