**Pandit Deendayal Petroleum University**
**School of Technology**
**Course Structure for B. Tech. Industrial Engineering**

| SEMESTER VIII | | | B. TECH. INDUSTRIAL ENGINEERING | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr. No. | Course Code | Course Name | Teaching Scheme | | | | | Exam Scheme | | | | | Total Marks |
| | | | | | | | | Theory | | | Practical | | |
| | | | L | T | P | C | Hrs./Wk. | MS | ES | IA | LW | LE/Viva | |
| 1 | IE 406 | Project Management | 3 | - | - | 6 | 3 | 30 | 60 | 10 | - | - | 100 |
| 2 | IE 407 | Supply Chain Management | 3 | - | - | 6 | 3 | 30 | 60 | 10 | - | - | 100 |
| 3 | IE 4XX | Department Elective - 3 | 3 | - | - | 6 | 3 | 30 | 60 | 10 | - | - | 100 |
| 4 | IE 408 | Organizationa Behavior and Human Resources Management | 3 | - | - | 6 | 3 | 30 | 60 | 10 | - | - | 100 |
| 5 | IE 409T | Simulation of Manufacturing and Service Systems (Theory) | 3 | - | - | 6 | 3 | 30 | 60 | 10 | - | - | 100 |
| 6 | IE 409P | Simulation of Manufacturing and Service Systems Practical) | - | - | 2 | 1 | 2 | - | - | - | 25 | 25 | 50 |
| 7 | IE 410 | Major Project | - | - | 12 | 6 | 12 | 30 | 60 | 10 | 100 | 50 | 250 |
| | | **Total** | **15** | **-** | **14** | **37** | **29** | | | | | | **800** |

MS = Mid Semester ES = End Semester IA = Internal Assessment (like quiz, assignments, etc.)
LW = Laboratory Work LE = Laboratory Exam

| IE 406 PROJECT MANAGEMENT | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Teaching Scheme | | | | | Examination Scheme | | | | | |
| L | T | P | C | Hrs/Week | Theory | | | Practical | | Total Marks |
| | | | | | MS | ES | IA | LW | LE/Viva | |
| 3 | 0 | 0 | 6 | 3 | 30 | 60 | 10 | -- | -- | 100 |

**UNIT I** **9**

**Introduction to Project Management:** Justifying Project Management, Projects – Definitions, The Project Management Triangle – Scope, Time and Cost, What is Project Management, Projects & Operations, The Project Life Cycle, Project Stakeholders, Project Management Process Groups, Project Management Knowledge Areas

**Specification of a Project:** The Project Charter, The Project Scope Document, Work Breakdown Structures, Project Contracts – Scope, Delivery, Costs and Risks.

**UNIT II** **9**

**Project Planning and Scheduling:** Project Network Representations, Activity Parameter Estimation – Time, Cost and Resources, Project Time Schedule, Gantt Charts, CPM and PERT, Activity and Project Crashing, Resources Scheduling.

**UNIT III** **12**

**Project Execution Management:** Quality Specifications, Quality Control Tools, Resources Procurement and Allocation, Systems and Processes, Communications and Documentation, Managing Teams, Resources Demobilization, Project Simulation and Risk Assessment, Use of IT tools.

**UNIT IV** **9**

**Project Monitoring and Control:** Project Work Measurement, Performance Measurement, Earned Value Management, Estimate Revision.

**Project Closure and Review:** Performance Evaluation – Scope, Time and Cost, Performance of Teams, Lessons Learnt, Project Closure Report.

**Integrated Examples/Cases**

**APPROXIMATE TOTAL** **39**

**Texts and References**


1. *PMBOK*® Guide, 4th Edition
2. Mantel Jr., Samuel J., Jack R. Meredith, Scott M. Shafer, Margaret M. Sutton with M. R. Gopalan
1. (2006) *Project Management Core Text Book*, First Indian Edition, Wiley, New Delhi.
2. Meredith, Jack R., and Samuel J. Mantel, Jr. (2010) *Project Management: A Managerial Approach*, 7/e, Wiley, New Delhi.
3. Maylor, Harvey (2003) *Project Management*, 3/e, Pearson, New Delhi.
4. Pinto, Jeffrey K. (2009) *Project Management: Achieving Competitive Advantage and MS Project*, 1/e, Pearson, New Delhi.
5. Gray, Clifford and Erik Larson (2005) *Project Management: The Managerial Process*, 3/e, Tata McGraw-Hill, New Delhi.
6. Nicholas, John M. (2008) *Project Management for Business, Engineering and Technology: Principles and Practice*, 3/e, Elsevier, New Delhi.

| IE 407 SUPPLY CHAIN MANAGEMENT | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Teaching Scheme | | | | | Examination Scheme | | | | | |
| L | T | P | C | Hrs/Week | Theory | | | Practical | | Total Marks |
| | | | | | MS | ES | IA | LW | LE/Viva | |
| 3 | 0 | 0 | 6 | 3 | 30 | 60 | 10 | -- | -- | 100 |

**UNIT I** **10**

Understanding the supply chain (SC), decision phases, process view of a SC. SC strategies, supply chain drivers and metrics, strategic issues related to facilities, inventory, transportation, sourcing, pricing, etc. The role of distribution in the SC, factors influencing distribution network design, framework for network design decisions. Models for facility location and capacity allocation.

**UNIT II** **10**

Globalization of SC networks, offshoring, uncertainty in global SC operations, the bullwhip effect, risk management in SC, concept of pooling, demand forecasting in a SC. Aggregate planning a SC, use of linear programming models. Cycle inventory in SC – various models.

**UNIT III** **10**

Transportation in SC, characteristics of transport modes, tradeoffs in transportation system design, third and fourth party logistics. Sourcing in SC, supplier scoring and assessment, supplier selection – auctions and negotiations. Supply chain contracts, risk sharing. Sourcing planning and analysis.

**UNIT IV** **8**

Pricing and revenue management in SC – perishable assets, seasonal demand, bulk and spot contracts. Information technology in SC, IT framework for SC, CRM, SRM. Coordination in SC, effect of lack of coordination on SC performance, vendor managed inventories, CPFR. Case studies in SCM.

**APPROXIMATE TOTAL** **38**

**Texts and References**


1. Chopra S., Meindl P. and Kalra D. V., Supply Chain Management: Strategy Planning and Operation, 4th edition, Pearson.
2. Simchi-Levi D., Kaminsky P., Simchi-Levi E. and Ravi Shankar, Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies, 3rd edition, Tata McGraw-Hill.
3. Chandrasekaran N., Supply Chain Management: Process, System and Practice, Oxford University Press.
4. Hopp, Wallace J., Supply Chain Science, McGraw-Hill Irwin.
5. Phillips, Robert, Pricing and Revenue Optimization, Stanford University Press.
6. Shah, Janat, Supply Chain Management: Text and Cases, Person Education.

| IE 409T SIMULATION OF MANUFACTURING AND SERVICE SYSTEMS (THEORY) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Teaching Scheme | | | | | Examination Scheme | | | | | |
| L | T | P | C | Hrs/Week | Theory | | | Practical | | Total Marks |
| | | | | | MS | ES | IA | LW | LE/Viva | |
| 3 | 0 | 0 | 6 | 3 | 30 | 60 | 10 | -- | -- | 100 |

**UNIT I** **10**

Principle of Computer Modeling and Simulation: Monte Carlo simulation. Nature of computer-modeling and simulation. Limitations of simulation, areas of applications. System and Environment: Components of a system -discrete and continuous systems, Models of a system -a variety of modeling approaches. Discrete Event Simulation: Concepts in discrete event simulation, manual simulation using event scheduling, single channel queue, multiple server queue, simulation of inventory problem. Demonstration of Monte-Carlo simulation using spreadsheets. Statistical Models In Simulation: Discrete distributions, continuous distributions.

**UNIT II** **10**

Random number generation, techniques for generation of random numbers, tests for random numbers. Probability distributions used in simulation. Data collection for simulation experiments, analyzing input data, goodness of fit tests.

**UNIT III** **12**

Introduction to simulation languages (like GPSS/H, Simpy or similar). Describing simulation models using blocks, transaction approach, modeling single and multiple server queues using a simulation language, controlling movement and timing. Comparison of simulation languages and simulation software, modeling using simulation software (like Arena or similar).

**UNIT IV** **6**

Design and Evaluation of Simulation Experiments: variance reduction techniques – antithetic variables, variables-verification and validation of simulation models. Output analysis of simulation experiments, presentation of results. Selection of simulation software, simulation packages.

**APPROXIMATE TOTAL** **38**

**Texts and References**


1. Jerry Banks, John S. Carson II, Barry L. Nelson and David M. Nicol, Discrete Event System Simulation, 4th edition, Prentice Hall India
2. Averill Law and David Kelton, Simulation Modeling and Analysis, 3rd edition, McGraw Hill
3. David Kelton, Randall Sadowski and Nancy Swets, Simulation with Arena, 5th edition, Tata McGraw Hill
4. Schriber, T. J., An Introduction to Simulation Using GPSS/H, Wiley

| IE 409P SIMULATION OF MANUFACTURING AND SERVICE SYSTEMS (PRACTICAL) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Teaching Scheme | | | | | Examination Scheme | | | | | |
| L | T | P | C | Hrs/Week | Theory | | | Practical | | Total Marks |
| | | | | | MS | ES | IA | LW | LE/Viva | |
| 0 | 0 | 2 | 1 | 2 | -- | -- | -- | 25 | 25 | 100 |

**LIST OF EXPERIMENTS** **8**

1. Building a basic simulation model with a spreadsheet
2. Building a basic simulation model with a simulation language
3. Simulation of single server queuing systems
4. Simulation of multiple server queuing systems
5. Simulation of travel of multiple categories of products/customers through a system
6. Building advanced simulation models with simulation software
7. Visualization/animation of simulation models
8. Output analysis

**IE 408 ORGANIZATIONAL BEHAVIOUR & HR**

| Teaching Scheme | | | | | Examination Scheme | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L | T | P | C | Hrs/Week | Theory | | | Practical | | Total Marks |
| | | | | | MS | ES | IA | LW | LE/Viva | |
| 3 | 0 | -- | 6 | 3 | 30 | 60 | 10 | -- | -- | 100 |

**UNIT-I** **10 Hours**

The Foundations of Organizational Behavior: Historical Background, Research Methodology, Theoretical, Frame works. OB in global context, Role of Information Technology, TQM, Learning Organizations.

**UNIT-II** **10 Hours**

Individual Behavior: Biographical Characteristics, Ability, Personality, Learning, implications for Performance and Satisfaction. Perception and Individual Decision –Making Values, Attitudes and Job Satisfaction.

**UNIT III** **10 Hours**

Basic Motivation Concepts: Work Motivation Approaches – Content and Process Theories of Work Motivation – Contemporary Theories of Work Motivation – Motivation through Job Design, Quality of Work Life, Goal Setting.

**UNIT IV** **10 Hours**

Foundations of Group Behavior: Communication and Group Decision Making – Leadership Styles and Skills – Power and Politics – Conflict and Inter – group behavior. Organization Culture: Organizational Change – Organizational Development Organizational Climate – Work Stress.

**Approximate Total** **40 Hours**

**Text books and References**


1. Organizational Behavior – Fred Luthans – McGraw Hill – 1997.
2. Human Behavior at work– Keith Davis – Prentice Hall India – 2007.
3. Organizational Behavior – Stephen. P. Robbins – Prentice Hall, India. - 9th edition2001.
4. Organizational Psychology – Robin, Kolb, etc – 1996.

**IE 416 BUSINESS PROCESS & ERP**

| Teaching Scheme | | | | | Examination Scheme | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L | T | P | C | Hrs/Week | Theory | | | Practical | | Total Marks |
| | | | | | MS | ES | IA | LW | LE/Viva | |
| 3 | 0 | -- | 6 | 3 | 30 | 60 | 10 | -- | -- | 100 |

**UNIT-I ERP AND TECHNOLOGY** **10**

Introduction – Related Technologies – Business Intelligence – E-Commerce and EBusiness – Business Process Reengineering – Data Warehousing – Data Mining – OLAP – Product life Cycle management – SCM – CRM

**UNIT-II ERP IMPLEMENTATION** **10**

Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition – Methodologies – Package selection – Project Teams – Process Definitions – Vendors and Consultants – Data Migration – Project management – Post Implementation Activities.

**UNIT III ERP IN ACTION & BUSINESS MODULES** **10**

Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Manufacturing – Human Resources – Plant maintenance – Materials Management – Quality management – Marketing – Sales, Distribution and service

**UNIT IV ERP MARKET** **10**

Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc – SSA Global – Lawson Software – Epicor – Intutive,Enterprise Application Integration – ERP and E-Business – ERP II – Total quality management – Future Directions – Trends in ERP.

**Approximate Total** **40 Hours**

**Text books and References**


1. *Alexis Leon, "ERP DEMYSTIFIED", Tata McGraw Hill, Second Edition, 2008.*
2. *Mary Sumner, "Enterprise Resource Planning", Pearson Education, 2007.*
3. *Jim Mazzullo,"SAP R/3 for Everyone", Pearson,2007.*
4. *Jose Antonio Fernandz, " The SAP R /3 Handbook", Tata McGraw Hill, 1998.*
5. *Biao Fu, "SAP BW: A Step-by-Step Guide", First Edition, Pearson Education, 2003.*