NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI - 620 015

M.Tech. DEGREE

in

Industrial Engineering and Management

SYLLABUS

FOR

CREDIT BASED CURRICULUM

OPERATIVE FOR STUDENTS OF 2013 -2014 ADMISSION

4 SEMESTER PROGRAMME

CODE : PR

DEPARTMENT OF PRODUCTION ENGINEERING

JUNE 2013
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Semester 1

MA611 Data Analytics


References:

PR651 Advanced Operations Research


References:

PR653 Analysis and Control of Manufacturing Systems

Production system –Forecasting and its types – Forecasting errors and tracking signals - Inventory costs Terminology of Inventory systems – Inventory policies –Analysis of Static Deterministic Inventory Models-Aggregate Production Planning - Value stream management for lean office Introduction to material requirements planning - Lot sizing – MRP Versus MRP II – Re planning frequency in MRP Introduction to Job Sequencing – n Jobs, One machine – n Jobs, Two machines – n Jobs, Three machines – n jobs - Two Jobs , M Machines – n jobs, M Machines – sequencing Jobs on Parallel Machines – Minimization of Setup costs - Travelling Salesman problem –Job shop scheduling – Assembly line balancing

References:
PR 655 Systems Engineering

Credits 3
Systems theory, Life-Cycle phases, Systems Engineering processes, Seven-phase and twenty-two phase life cycle for systems acquisition. Problem or Issue identification, Formulation of issues with an example

References:

PR 657 Data Analytics Lab

Credits 2
The objective of this lab is to enable students to have exposure on Data Analytics using SYSTAT, SPSS and GaBi.

1. Linear Regression and Correlation
2. Testing of Hypothesis – I & II
3. Analysis of Variance (ANOVA)
4. Factor analysis
5. Life Cycle Assessment of products
6. Cluster Analysis
7. Performance Measurement of Industrial systems

PR 659 Operations Management Lab

Credits 2
The objective of this lab is to have practical exposure on operations management packages like OM Expert, CPLEX, LINDO, GAMS, TORA extra and also to study on the ergonomic aspects of human evaluation.

1. Forecasting Models
2. Linear Programming Problem
3. Transportation Model
4. Inventory Models
5. Scheduling Case studies
6. Material Requirements Planning
7. Project management
8. Facilities layout
9. Ergonomics Study
   a. Performance rating using stop watch
   b. Peg board experiment
   c. Time study trainer
d. Fitness study using treadmill
e. Fitness study using ergo cycle

Semester 2
PR 652 Quality & Reliability Engineering  L 3  T 0  P 0  Credits 3

References:

PR654 Modeling and Simulation  L 2  T 1  P 0  Credits 3

References:

PR656 Supply Chain Management  L 3  T 0  P 0  Credits 3

References:
2. Logistics, David J.Bloomberg, Stephen Lemay and Joe B.Hanna, PHI 2002
4. Modeling the supply chain, Jeremy F.Shapiro, Thomson Duxbury, 2002

PR658 Project Management  L 2  T 1  P 0  Credits 3

References:

**PR 660 Simulation Lab**

*L 0 T 0 P 3*  
Credits 2  
(*Packages: ARENA, Flexsim, QUEST, Simquick & Witness and other emerging packages, Programming in C and Matlab*)

**LIST OF EXERCISES**

- Random Number Generation approaches
- Random Variate Generation
- Simulation of Manufacturing Shop
- Simulation of Multiple Servers Queuing System
- Simulation of Supply Chain Inventory System
- Simulation of Batch Production System
- Simulation of Multi Machine Assignment System
- Simulation of Manufacturing and Material Handling Systems
- Simulation of a Shop Floor
- Simulation of Material Handling Systems

**PR 680 Supply Chain Management Lab**

*L 0 T 0 P 3*  
Credits 2  
The objective of this lab is to enable students to understand the practical applications of Supply Chain Management concepts.

1. Network design and operations
2. Designing and planning transportation networks
3. Designing and planning distribution networks
4. Value Stream Mapping – Development of Current State Map and Future State Map
5. Decision Making in Supply Chains
6. Lean, agile and leagile supply chains
7. Supply chain restructuring
8. Supply chain performance measures
9. Inventory optimization in supply chain
10. Forecasting models in supply chain
Electives

Industrial Engineering stream

PR661 Intelligent Manufacturing Systems  L 3 T 0 P 0  Credits 3  

References:

PR662  Research methodology  L 3 T 0 P 0  Credits 3  

References:

PR663  Design and Analysis of Experiments  L 3 T 0 P 0  Credits 3  
Steps –Single Factor Experiments- ANOVA- Factorial Experiments- $2^k$ designs with Two and Three factors- Confounding, blocking, nested, Fractional factorial designs - Taguchi Techniques- Quality Loss function, orthogonal designs, application to Process and Parameter design.

References:

PR664 Enterprise Resource Planning  L 3 T 0 P 0  Credits 3  
ERP: An Overview - Benefits of ERP - ERP and Related Technologies - Business Process Reengineering (BPR), Data Warehousing - Data Mining, ERP Implementation - ERP Implementation Lifecycle, Business Modules in an ERP Package - ERP Market, Enterprise Integration Applications (EIA) - ERP and E-Commerce - ERP and Internet - Future Directions in ERP.

References:

PR665 Lean and Agile Manufacturing L 3 T 0 P 0 Credits 3

References:

PR666 Facilities planning and design L 3 T 0 P 0 Credits 3

References:

PR667 Production Management Systems L 3 T 0 P 0 Credits 3
Productivity-productivity measurement models-role of work study-work measurement techniques-ergonomics-CIM and Production Management Systems- MRP I, MRP II Lot sizing in MRP-Lot for lot, economic order quantity-periodic order quantity-part period balancing-introduction to optimized production technology-KANBAN-types of KANBAN- value engineering (VE) - approaches of value analysis and engineering –Effective organization for value work, function analysis system techniques-FAST

References:

PR668 Advanced Optimization Techniques L 3 T 0 P 0 Credits 3

**References:**

**PR669 Work Design and Ergonomics**

Introduction to work study - productivity measurement models-Kurosawa structural approach, Lawlor’s approach, Gold’s approach Quick Productivity Appraisal approach (QPA), Motion and time study Work methods design Work measurement and its methods Measuring work by physiological methods Introduction work study/ergonomics softwares, Human Factors, Ergonomics practices design of controls and workspace

**References:**

**PR670 Sustainable Manufacturing**


**References**
**Electives**

**Management stream**

**PR671 Financial Management**  
L 3 T 0 P 0  
Credits 3  
Financial management – Nature, Scope, Objectives, Decisions -Management of current asset -  
Short and intermediate financing-Capital investment and evaluation-Long term financing  

**References:**

**PR672 Marketing Management**  
L 3 T 0 P 0  
Credits 3  
Concepts in Marketing - Marketing Process, Marketing concepts, Environment-Buying  
Behaviour and Market Segmentation-factors, Motives, Types, Buying Decision, Segmentation  
factors, Demographic, Psychographic and Geographic Segmentation, Process, Patterns-Product  
Pricing and Marketing Research- Pricing, Decisions and Pricing Methods, Pricing Management-Marketing Planning and Strategy Formulation-Portfolio Analysis, BCG, GEC Grids-Advertising,  
Sales Promotion and Distribution-Impact, Goals, Types, Sales Promotion – Point of purchase,  
Unique Selling propositions, Characteristics, Wholesaling, Retailing, Channel Design, Logistics  
Modern Trends in Retailing.  

**References:**

**PR673 Total Quality Management**  
L 3 T 0 P 0  
Credits 3  
Principles of TQM – Quality Gurus and their contributions – Old and New Quality Control tools  
– Quality Function Deployment – Failure Modes and Effect Analysis – Vendor relations –vendor  
qualification process – vendor quality surveys – Vendor quality improvement – vendor quality  
rating and evaluation - ISO 9000 standards – ISO 14000 standards – Quality Costing – Quality  
Audit – Product and Process audit – Six Sigma – Benchmarking - TQM in Service Sector–  
Application case studies on TQM.  

**References:**
PR 674 Human Resource Management  L 3 T 0 P 0  Credits 3

References:

PR675 Decision Support Systems  L 3 T 0 P 0  Credits 3
DSS components- Data warehousing, access, analysis, mining and visualization-modeling and analysis-DSS development -Group support systems- enterprise DSS- supply chain and DSS- knowledge management methods, technologies and tools-Artificial intelligence and expert systems- Representation in logic and schemas, semantic networks, production rules and frames, inference techniques – DSS applications.

References:

PR676 Knowledge Management  L 3 T 0 P 0  Credits 3

References:

PR677 Product Life Cycle Management  L 3 T 0 P 0  Credits 3

References:
PR678 Technology Management


References:

PR679 Multi-Criteria Decision Making Techniques


References