



# OPERATIONS MANAGEMENT

## PROF. INDERDEEP SINGH

Department of Mechanical Engineering  
IIT Roorkee

**PRE-REQUISITES** : No-prerequisite, any student enrolled for a UG/PG degree in any discipline of Mechanical Engineering, Production Engineering, BBA, BBM, MBA.

**INTENDED AUDIENCE** : Interested students

**INDUSTRIES APPLICABLE TO** : All industries that efficiently produce and deliver goods and services to the customers.

### COURSE OUTLINE :

The current competitive business environment is forcing the organizations to adopt the latest tools, techniques and strategies for managing their resources in the most effective and efficient manner. The topics of the course deals with the management of resources and activities that lead to production of goods of right quality, in right quantity, at right time and place in the most cost-effective manner. The course focuses on the basic concepts, issues, and techniques adopted worldwide for efficient and effective operations. The topics include operations strategy, product design and development, forecasting, facility planning and layout, aggregate production planning, capacity planning, project management, production control, materials management, inventory and quality management, JIT and Kanban System.

### ABOUT INSTRUCTOR :

Prof. Inderdeep Singh is currently working as Associate Professor in Department of Mechanical and Industrial Engineering at Indian Institute of Technology Roorkee. He has taught among others, the industrial engineering courses such as Production Planning and Control, Product Design and Development, Work System Design, Industrial Management and Quality Management. He has been actively involved in the National Mission Project on Education Through ICT (NME-ICT) of Government of India. He has completed three video and one web course under the National Programme on Technology Enhanced Learning (NPTEL). He has developed suitable pedagogical methods for two under-graduate courses of Mechanical Engineering.

### COURSE PLAN :

**Week 1:** Introduction to Course, Operations Management: Objectives, Operations Management: Functions and Scope, Types of Production Systems, Operations Strategy.

**Week 2:** Product Life – Cycle, Value Engineering Concepts, Design for X (DFX), Ergonomics in Product Design, Rapid Prototyping: Concept, Advantages.

**Week 3:** Sales Forecasting, Forecasting System, Qualitative Methods of Forecasting, Quantitative Methods - I, Quantitative Methods – I.

**Week 4:** Facility Planning, Factors Affecting Plant Location, Plant Location: Case Study on Uttarakhand, Location Evaluation Methods-I, Location Evaluation Methods-II.

**Week 5:** Facility Layout and Planning-I, Facility Layout and Planning-II, Factors Influencing Plant Layout, Material Flow Patterns, Tools and Techniques used for Plant Layout Planning.

**Week 6:** Production Planning and Control, Process Planning, Aggregate Production Planning, Capacity Planning: Introduction, Capacity Planning: Examples.

**Week 7:** Project Scheduling, Network Diagrams, Critical Path Method (CPM), Critical Path Method: Problems, Critical Path Method: Problems.

**Week 8:** Program Evaluation and Review Technique (PERT), PERT Problems, PERT Problems, Time Cost Trade Off (Crashing), Project Network: Crashing Problems.

**Week 9:** Production Control, Sequencing, Sequencing Problems-I, Sequencing Problems-II, Master Production Scheduling (MPS).

**Week 10:** Concept of Quality, Total Quality Management (TQM), Total Productive Maintenance (TPM), Statistical Quality Control (SQC), Six Sigma.

**Week 11:** Materials Management, Inventory Control, Economic Order Quantity (EOQ) Models, Economic Order Quantity (EOQ): Problems, Production Quantity Model.

**Week 12:** Just in Time (JIT), Kanban System, Materials Requirement Planning (MRP)-I, Materials Requirement Planning (MRP)-II, Enterprise Resource Planning (ERP).