



# PRINCIPLES OF INDUSTRIAL ENGINEERING

## PROF. D K DWIVEDI

Department of Mechanical Engineering  
IIT Roorkee

**INTENDED AUDIENCE :** UG/PG Students of Industrial Engineering & Practicing Engineers

### COURSE OUTLINE :

The course content is designed to have systematic and comprehensive understanding on various aspects related with industrial engineering and its relevance in the industrial environment. It is proposed to include organizational structure, plant location and plant layout, production planning and control, scheduling, forecasting, statistical quality control, total quality management, work study, method study and work measurement, ergonomics. Presentations will be supported with case studies for effective communication of concepts and techniques.

### ABOUT INSTRUCTOR :

Prof. D K Dwivedi obtained BE (mechanical engineering), in 1993 from GEC Rewa, ME (welding engineering) from Univ. of Roorkee in 1997 and PhD in Met. Engineering from MNIT, Jaipur in 2003. He has about 9 years teaching experience at NIT Hamirpur and 14 years at IIT Roorkee in subjects related to manufacturing at UG level and Welding Engineering related subjects at PG level. He has published more than 120 research papers in SCI/SCIE indexed journals and undertaken 20 sponsored research and 50 industrial consultancy projects. He has authored two books entitled "Production and Properties of Cast Al-Si Alloys with New Age International, New Delhi (2013) and Surface Engineering with Springer, New Delhi (2018).

### COURSE PLAN :

**Week 1 :** 1. Introduction 2. Introduction: Developments, Objectives, & Functions 3. Introduction: Functions and tools 4. Tool of IE and Organizational Structure 5. Organizational Structure\

**Week 2 :** 6. Organizational Structure: Roles 7. Organizational Structure: Types 8. Organizational Structure: Product Strategies 9. Organizational Structure: Process & Product Organization 10. Organizational Structure and culture

**Week 3 :** 11. Organizational Structure: Principles 12. Plant Location & Layout: Selection of Site 13. Plant Location & Layout: Factor Affecting Selection of Site 14. Plant Location & Layout: Methods for Selection of Site 15. Plant Location & Layout: Methods for Selection of Site II

**Week 4 :** 16. Plant Location & Layout: Methods for Selection of Site III 17. Plant Location & Layout: Methods for Selection of Site IV 18. Plant Layout: Purpose and Types of Layout 19. Plant Layout: Types of Layout 20. Plant Layout: Cellular and Process Layout

**Week 5 :** 21. Plant Layout: Process Layout Design 22. Plant Layout: Process Layout Design II 23. Plant Layout: Product Layout Design 24. Organization of Facility 25. Organization of Facility & Material Handling

**Week 6 :** 26. Material Handling 27. Production Planning and Control: Scope 28. Production Planning and Control: Scope II 29. Production Planning and Control: Capacity Planning 30. Production Planning and Control: Capacity Planning & Scheduling

**Week 7 :** 31. Production Planning and Control: MRP, Routing, Scheduling 32. Production Planning and Control: Scheduling 33. Production Planning and Control: Priority Sequencing 34. Production Planning and Control: Priority Sequencing II 35. Production Planning and Control: Relative Performance of Priority Sequencing Rules

**Week 8 :** 36. Inventory: Fundamentals 37. Inventory: Models 38. Inventory: Models II 39. Inventory: Wilson Model 40. Inventory: Gradual Replenishment Model

**Week 9 :** 41. Project Management & Network Modelling: Introduction 42. Network Modelling: PERT 43. Network Analysis: PERT 44. Network Analysis: PERT II 45. Network Analysis: Crashing Network and CPM

**Week 10:** 46. Network Analysis: Critical Path Method 47. Forecasting: Introduction 48. Forecasting: Methods 49. Forecasting: Methods II 50. Forecasting: Methods III

**Week 11:** 51. Forecasting: Methods IV 52. Forecasting: Methods V 53. Quality Control: Introduction 54. Quality Control: Fundamentals 55. Quality Control: SPC

**Week 12:** 56. Quality Control: SPC II 57. Quality Control: Control Charts 58. Quality Control: Control Charts II 59. Quality Control: Control Charts for Attributes 60. Productivity & Work Study