

Ph.D. Course Work Syllabus

Paper-II Mechanical Engineering

Paper Code-(Ph.D.-102)

Contact Hours: 4 Hrs/ week

Continuous Assessment: 40 Marks

Credit: 4

End Term Exam: 60 Marks

Unit 1

Lean Manufacturing: History of Lean Manufacturing, Objectives of Lean Manufacturing, Key Principles of Lean Manufacturing, Key implications of Lean Manufacturing.

Unit 2

Lean Manufacturing Concepts: Value Creation and Waste, Main Kinds of Waste, Customer pull vs push, Pull Production Different models of Pull Production, Impact of Pull-Production on Production Planning, one piece flow Takt time and calculation, Continuous Flow, Mixing Continuous and Discontinuous Flow, Continuous Improvement, Kaizen, People Involvement, Cellular Layout, Administrative Lean.

Unit 3

Lean Manufacturing Tools: Standard Work, Communication of Standard Work to employee's, Standard work and flexibility, TPS and lean house, Visual Management, Quality at the Source, Value Stream Mapping, The Five S's, Preventative Maintenance, Total Productive Maintenance, Changeover/ setup time, Batch size reduction, Production layout and point of use storage, Kanban, Production Levelling, Pacemaker, Overall Equipment Effectiveness.

Unit 4

Lean Manufacturing Implementation: Value Stream Mapping: Defining value, Create VSM current state and calculation of VA and NVA, Set up future state, understand gaps, identify process weakness and bottlenecks, developing action plan., Lean layout to reduce inventory, space, transportation and motion, improve information flow, Standardization work and simulation, Standard work combination table, TPM to reduce machine breakdown time, SMED to reduce changeover time, On site quality management and control of scrap and rework, 5S and visual management, Kanban and pull, Judoka, Pursue perfection and kaizen.

Unit 5

Inventory and Quality Control under Lean manufacturing: Principles of inventory control, Comparison of JIT/lean and large lot EOQ operations, JIT purchasing and supplier relations, New technologies supports Lean manufacturing, JIT/EOQ Models, Methodology for vendor evaluation, Performance measurement of JIT inventory control, Implementing strategy for JIT purchasing,

Principles of JIT quality control, Process control charts, Quality control circles, Performance measurement of JIT quality control.

Reference books:

1. Kiyoshi Suzaki, The new shop floor management, The free press New York
2. How to implement lean manufacturing by Lonnie Wilson, Mcgraw Hill
3. Toyota Kata by Mike Rother, Mcgraw Hill, ISBN 978-0-07-163523-3