

RO8092 LEAN MANUFACTURING

DETAILED SYLLABUS

OBJECTIVES:

- To introduce the students the lean manufacturing concepts
- To understand group technology and use of it for part identification
- To understand value stream mapping in lean manufacturing.
- To teach the tools and method used in lean manufacturing
- To introduce concept of Total Productive Maintenance and other system

UNIT I INTRODUCTION

Origins and objectives of lean manufacturing – lean process, 3M concept key principles and implications of lean manufacturing – traditional Vs lean manufacturing characteristics – roadmap for lean implementation and lean benefits - study of Ford and Toyota production systems - JIT manufacturing, Lean building blocks. LEAN MANUFACTURING CONCEPTS: Value creation and waste elimination – seven types of waste – pull production-different models of pull production -the Kanban system-continuous flow-the continuous improvement process / Kaizen-Worker involvement. Design of Kanban quantities – Leveled production - tools for continuous improvement.

UNIT II GROUP TECHNOLOGY AND CELLULAR LAYOUT

JIT with cell manufacturing – part families- production flow analysis – Composite part concept – machine cell design – quantitative analysis – case studies – single piece flow

UNIT III VALUE STREAM MAPPING

The value stream– benefits mapping process - the current state map–mapping icons - mapping steps. VSM exercises - Takt time calculations.

UNIT IV LEAN MANUFACTURING TOOLS AND METHODOLOGIES

Standardized work–standard work sequence timing and working progress. Quality at source – Autonomation /Jidoka, Visual management system, Mistake proofing / Poka-Yoke. 5S technique – Elements and waste elimination through 5S, advantages and benefits - 5S-audit - visual control aids for improvement, flexible work force

UNIT V TOTAL PRODUCTIVE MAINTENANCE

Goals and benefits – Hidden factory, the six big losses, types of maintenance. Overall equipment effectiveness - pillars of TPM and implementation. Change over and set up timer education techniques. Temple of quality, OEE calculations. RECONCILING LEAN WITH OTHER SYSTEMS: Study of lean Six-sigma and lean design – lean and ERP- lean with ISO9001:2000 - administrative lean.

TEXT BOOKS:

1. Micheal Wader, “Lean Tools: A Pocket guide to Implementing Lean Practices”, Productivity and Quality Publishing, 2002.

2. William M Feld, "Lean Manufacturing: Tools, Techniques and How to use them", APICS, 2001
3. Dennis P Hobbs, "Lean Manufacturing Implementation", Narosa Publications, 2004
4. Gopalakrishnan N, "Simplified Lean Manufacture", PHI Learning Pvt Ltd, 2010

REFERENCES:

1. Richard B Chase "Production and Operations Management", McGraw Hill, 2003
2. Taiichi Ohno, "Toyota Production Systems: Beyond Large Scale Production", Productivity Press, 1988.
3. Askin R G and Goldberg J B, "Design and Analysis of Lean Production Systems", John Wiley and Sons, 2003.
4. Mahadevan B, "Operations Management", Pearson, 2010