



**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani**  
**Pilani Campus**  
**AUGS/ AGSR Division**

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**SECOND SEMESTER 2020-21**  
**COURSE HANDOUT**

**Date: 18.01.2021**

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

**Course No : MF F418**  
**Course Title : LEAN MANUFACTURING**  
**Instructor-in-Charge : ABHIJEET K. DIGALWAR**

**1. Course Description:**

Fundamentals of continuous improvement, value added and waste elimination, elements of lean production: small lot production, setup time reduction, maintaining and improving equipment, pull production systems, focused factories and group technologies, work cells and cellular manufacturing, standard operations, quality of design, systems for eliminating defects, simplified production planning and control systems: scheduling for smooth flow, synchronizing and balancing process, planning and control in pull production, beyond the production systems: managing the supply chain, activity based costing, performance measurement.

**2. Scope and Objective of the Course:**

In factories around the globe, Toyota consistently raises the bar for manufacturing, product development and process excellence. The result is an amazing business success story: steadily taking market share from price-cutting competitors, earning far more profit than any other automaker, and winning the praise of business leaders worldwide. With a market capitalization greater than the value of General Motors, Ford and Chrysler combined; Toyota is the world's most profitable automaker. Toyota's well known "secret weapon" is lean manufacturing – the revolutionary approach to business processes that it invented in the 1950's and has spent decades for perfecting. Today business around the world is attempting to implement Toyota system to maintain competitive advantage. But are they?

The course explains Toyota's unique approach to Lean manufacturing, that drive Toyota's quality and efficiency obsessed culture. You will valuable insights that can be applied to any organization and any business process, whether in services or manufacturing. You will discover how the right combination of long term philosophy, processes, people and problem solving can transform your organization into a lean, learning enterprise – the Toyota way.

At the end of this course, the students will be able to understand the importance of lean manufacturing / The Toyota Way as a strategic weapon, the students will be able to understand the World –Class power of the Toyota way

**3. Text Books:**

T1. Pascal Dennis, "Lean Production Simplified", 2nd Edition, Productivity Press, 2007.

T2. Jeffrey K. Liker, "The Toyota Way", McGraw-Hill Edition, New Delhi, 2004.

**4. Reference Books:**

R1 James P. Womack and Daniel T. Jones, "Lean Thinking: Banish Waste & Create Wealth in Your Corporation, Revised Edition, Simon & Shuster, 2001.

R2 Nicholas, John M., "Competitive Manufacturing Management", Tata McGraw Hill Education Pvt. Ltd. New Delhi, 2012



## 5. Course Plan:

Module No.	Lecture Session	Reference	Learning outcomes
Birth of lean production	<b>1-2</b>	<b>T1 Ch1, R2 Ch1</b>	Types of production systems, growing dysfunction, birth of lean production, virtue of necessity, lean revolution at Toyota
Lean production system	<b>3-5</b>	<b>T1 Ch2 R2 Ch3</b>	Why lean production? Systems and systems thinking, basic image of lean production, customer focus, Muda, Mura and Muri, Toyota's Seven Wastes
Stability and Standardized work	<b>6-14</b>	<b>T1 Ch 3 and 4 R2 Ch 2 and 7</b>	Standards in lean system, Continuous Improvement, 5S system, total productive maintenance
Just-In-Time and Jidoka	<b>15-25</b>	<b>T1 Ch 5 R2 Ch 5, 6 and 8</b>	Why JIT, principles of JIT, JIT system, pull systems, kanban, kanban rules, Small lot production, setup time reduction, SMED methodology, development of Jidoka concept, why jidoka, expanded role of conveyance, production levelling, Poka Yoke,
Value Stream Mapping	<b>25-30</b>	<b>T1 Ch 5 and Class Notes</b>	VSM Process, TAKT time, analysis of data, symbols, benefits, Visual Management, Kaizen, Case Studies
Involvement and Customer Focus	<b>31-35</b>	<b>T1 Ch7, 8 and 9 T2 Ch 15, 16 and 17</b>	Why involvement? The terrible waste of humanity, activities supporting involvement, Leadership development, people development, supplier development, kaizen circle activity, practical kaizen training, suggestion programs, what is planning? Why plan? problems with planning, hoshin planning, hoshin planning system, four phases of hoshin planning, what is lean culture? How does lean culture feel?
14 principles of Toyota way	<b>36-40</b>	<b>T2</b>	The world-class power of the Toyota way, Toyota way in action

## 6. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of component (Close Book/ Open Book)
Mid-Semester Test	90 Min.	25%	<TEST_1>	CB/OB
Comprehensive Examination	2 h	40%	11-05-2021 FN	CB/OB
Assignments/Class Test/Group Project		35%	TBA	CB/OB

## 7. Chamber Consultation Hour: Friday 3.00 PM



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**8. Notices:** All notices regarding the course will be communicated through Nalanda/ERP/email.

**9. Make-up Policy:** No Make-up for class tests and non-appearance in class tests may lead to NC.

**10. Note (if any):**

**Instructor-in-charge**  
**Course No. MF F418**