

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI- HYDERABAD CAMPUS**  
**SECOND SEMESTER 2023-2024**  
**Course Handout (Part II)**

Date: 09/01/2024

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 Name** : Lean Manufacturing  
**Instructor-in-charge** : AMIT KUMAR GUPTA  
**Lecture schedule** : Tue, Thu, Sat – 2 (09 AM – 10 AM) @ G103

**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:**

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.

**3. Objective:**

- Opportunity to see Toyota at close
- To provide a clear and simple guide to lean manufacturing / Toyota production system
- Provides a great way to begin learning and opportunity for you to start your own journey (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
- At the end of this course, the student will be able to understand the World –Class power of the Toyota way

**3. Text Books:**

- T1. Pascal Dennis, "Lean Production Simplified", 2<sup>nd</sup> Edition, Productivity Press, 2007.  
T2. Jeffrey K. Liker, "The Toyota Way", McGraw-Hill Edition, New Delhi, 2004.

**4. Reference Books:**

- R1. Masaaki Imai, “Gemba Kaizen: A Commonsense, Low-Cost Approach to Management”, McGraw-Hill, 1997.
- R2. James P. Womack and Daniel T. Jones, “Lean Thinking: Banish Waste & Create Wealth in Your Corporation, Revised Edition, Simon & Shuster, 2001.
- R3. Mike Rother, “Learning to See: Value Stream Mapping to Create Value & Eliminate MUDA”, Lean Enterprise Institute, 2003.
- R4. Jeffrey K Liker and David Meier, “The Toyota Way Field Book: A Practical Guide for Implementing Toyota’s 4Ps”, Tata McGraw-Hill Edition, 2006.
- R5. John Allen, Charles Robinson and David Stewart, “Lean Manufacturing: A Plant Floor Guide”, Society of Manufacturing Engineers, Michigan, 2001.
- R6. Mike Rother, “Toyota Kata: Managing People for Improvement, Adaptiveness, and Superior Results”, Tata McGraw-Hill Edition, 2010.

## 5. Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Reference Chap./ Sec.# (Book)
1-3	Types of production systems, growing dysfunction, birth of lean production, virtue of necessity, lean revolution at Toyota	Birth of lean production	1, (T1)
4-5	Why lean production? Systems and systems thinking, basic image of lean production, customer focus, muda	Lean production system	2, (T1)
6-8	Standards in lean system, 5S system, total productive maintenance	Stability	3, (T1)
9-12	Lean thinking, why standardized work? Elements of standardized work, Standardized work and kaizen, common layouts	Standardized work	4, (T1)
13-20	Why JIT, principles of JIT, JIT system, kanban, kanban rules, expanded role of conveyance, production leveling, three types of pull systems, value stream mapping	Just-In-Time	5, (T1)
21-24	Development of Jidoka concept, why jidoka, poka-yoke, inspection systems and zone control, using poka-yokes and implementing jidoka	Jidoka	6, (T1)
25-26	Why involvement? The terrible waste of humanity, activities supporting involvement, kaizen circle activity, practical kaizen training, suggestion programs	Involvement	7, (T1)
27-28	What is planning? Why plan? Problems with planning, hoshin planning, hoshin planning system, four phases of hoshin planning	Hoshin planning	8, (T1)
29-30	What is lean culture? How does lean culture feel?	The culture	9, (T1)
31	Operational excellence as a strategic weapon, story of Toyoda family and Toyota production system (TPS), heart of the TPS: eliminating waste, 14 principles of Toyota way, Toyota way in action	The world-class power of the Toyota way	1-6, (T2)
32	Principle 1: Base your management decisions on a long-term philosophy, even at the expense of short-term financial goals	Long-term philosophy	7, (T2)

33	Principle 2: Create continuous process flow to bring problems to the surface Principle 3: Use “Pull” systems to avoid overproduction	The right process will produce the right results	8-9, (T2)
34	Principle 4: Level out the workload (Heijunka) Principle 5: Build a culture of stopping to fix problems, to get quality right the first time	The right process will produce the right results	10-11, (T2)
35	Principle 6: Standardized tasks are the foundation for continuous improvement and employee empowerment Principle 7: Use visual control so no problems are hidden	The right process will produce the right results	12-13, (T2)
36	Principle 8: Use only reliable, thoroughly tested technology that serves your people and process Principle 9: Grow leaders who thoroughly understand the work live the philosophy, and teach it to others	The right process will produce the right results. Add value to the organization by developing your people and partners	14-15, (T2)
37-38	Principle 10: Develop exceptional people and teams who follow your company’s philosophy Principle 11: Respect your extended network of partners and suppliers by challenging them and helping them improve	Add value to the organization by developing your people and partners	16-17, (T2)
39-40	Principle 12: Go and see yourself to thoroughly understand the situation (Genchi Genbutsu) Principle 13: Make decisions slowly by consensus, thoroughly considering all options; Implement decisions rapidly	Continuously solving root problems drives organizational learning	18-19, (T2)
41-42	Principle 14: Become a learning organization through relentless reflection (Hansei) and continuous improvement (kaizen) Using the Toyota way to transform technical and service organizations, build your own lean learning enterprise, borrowing from the Toyota way	Continuously solving root problems drives organizational learning Applying the Toyota way in your organization	20-22, (T2)

## 6. Evaluation Scheme:

No.	Evaluation Component	Duration	Weightage	Date & Time	Nature of EC
1.	Mid-Sem. Test	90 min	20 %	15/03 - 4.00 - 5.30PM	CB/OB
2.	Seminars/Assignments/Quizzes	---	40 %	-	OB
3.	Compre. Exam.	180 min	40 %	<b>17/05 AN</b>	CB/OB

**7. Chamber Consultation Hour:** Will be announced by the instructor in the class.

**8. Notices:** Notices regarding this course will be displayed on the **CMS**.

**9. Make up Policy:** Make-up will be granted only to genuine cases with prior permission from the IC.  
For cases related to illness, proper documentary evidence is essential.

**10. Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**Instructor-in-charge**  
**MF F418**