Operations Management (OTM-841)

National University of Sciences & Technology (NUST)

MS I&E 2K24

Course Details:

Course Title: Operations Management **Credit Hours:** 3

Course Code: OTM-841 **Pre-requisite:** N/A

Program: MS I&E **Sections:** N/A

Course Description:

Introduces operations as a functional area of management and explores its links with other key functional areas of the firms. You will learn about firm's (manufacturing and services) performance evaluation and management. It covers the areas such as resource planning, product and process design, process improvement, production planning and scheduling, statistical quality control, project management, forecasting, technology deployment and its integration with modern decision support systems to support and improve the operational performance within the firm. Both manufacturing and service systems will be explored. You will be introduced to contemporary operations management issues such as Just-in-time systems, flexible manufacturing systems, Integration of internet of things systems, mass customization, process reengineering, value stream mapping and quality management programs.

Course Learning Outcomes:

Upon completion of this course, the student should be able to:

1. CLO 1. *Summarize* key concepts and theories of operations management.
2. CLO 2. *Apply* operations management tools and techniques for process improvement /problem solving.
3. CLO 3. *Analyze* service/production challenges in operations using advance theories and best practices such as Lean, Six Sigma, capacity and bottleneck management, etc
4. CLO 4. *Evaluate* customized solutions to improve operational efficiency in the local businesses.

Program Goals & Learning Objectives:

General Learning Goals & Objectives of **MS I&E program** are:

Goal 1: Students will develop specialized knowledge of the field

LO 1.1: Students will be able to analyze the key concepts in the field

LO 1.2: Students will be able to evaluate organizational problems

Goal 2: Students will work in team settings

LO 2.1: Students will be able to work towards achieving team goals
LO 2.2: Students will be able to demonstrate effective team behavior

Goal 3: Students will learn how to communicate effectively

LO 3.1: Students will be able to communicate effectively in oral presentations
LO 3.2: Students will be able to create professional reports

Goal 4: Students will value ethics in research

LO 4.1: Students will be aware of ethical issues in research
LO 4.2: Students will adhere to ethical standards while conducting research

Mapping - CLOs with LOs

Learning Objective	LO 1.1	LO 1.2	LO 2.1	LO 2.2	LO 3.1	LO 3.2	LO 4.1	LO 4.2	Not mapped	Evaluation Item
CLO 1									x	Quiz / Assignment/Exam
CLO 2		✓								Final Exam
CLO 3	✓									Final exam
CLO 4		●								Project

Legends indicate:

✓ mapped and assessed CLO ● mapped but not assessed CLO x unmapped CLO

Required Course Material:

Textbook (s):

1. **Operations Management,** 12th ed., by William J Stevenson. Prentice Hall, 2015.
2. **Principles of Operations Management,** 10th ed., by Jay Hazier, Barry, Render. Pearson, 2011

Reference Book (s):

1. **Operations Management**, by Nigel Slack, Stuart Chambers, Christine Harland, Alan Harrison and Robert Johnston, Pitman publishing, 2001.
2. **Operations Management, Design, Planning and Control for Manufacturing and Services,** Dilworth B. James, McGraw-Hill International Editions.

Other Material:

1. Research Papers
2. HBS Case Studies.
3. Instructor
4. notes

Software

Following software will be used for solving complex operation management problems during course and projects

1. Microsoft Excel

Course Evaluation:

Grading will be done as per NBS criteria. The breakup is as follows:

Final Exam	35%
Midterm	20%
Final Project	20%
Quizzes	10%
Assignments	10%
Case Study	5%

Weekly Schedule:

Week	Lecture No. and Topic	Preparation Material	Session Outcomes (Students should be able to…)
1	Lecture 1: Introduction to course • Course outline and policies • Course assessment, etc. Introduction to Industry Project • Industrial problem solving skills • New business ideas Introduction to Operations Management • Scope of Operations Management • Why Study OM? • What Operations Manager do?	Chapter 1 of **Operations Management**, 12th ed., by William J Stevenson	Summarize key concepts and theories (CLO 1)
	Lecture 2: Forecasting • Elements of a Good Forecast • Steps in the Forecasting Process	Chapter 3 of **Operations Management**, 12th ed., by William J Stevenson	Apply operations management tools and techniques (CLO 2)

Week	Lecture No. and Topic	Preparation Material	Session Outcomes (Students should be able to…)
2	<u>Lecture 3 & 4:</u> Forecasting (Continued) • Forecasts Based on Time-Series • Associative Forecasting Techniques • Monitoring Forecast Error • Choosing a Forecasting Technique	Chapter 3 of **Operations Management**, 12th ed., by William J Stevenson	Apply operations management tools and techniques (CLO 2)
3	<u>Lecture 5 & 6:</u> Managing Quality • Defining quality • Total Quality Management • Six Sigma • Tools of TQM	Chapter 9 of **Operations Management**, 12th ed., by William J Stevenson	Summarize key concepts and theories (CLO 1)
4	<u>Lecture 7 & 8:</u> Statistical Process Control • Purpose of a control chart • Statistical Process Control • Role of the central limit theorem in SPC • Process Capability • Acceptance Sampling	Supplement 6 of ***Principles of Operations Management*** *11th ed.* by *Heizer*	Apply operations management tools and techniques (CLO 2)
5	<u>Lecture 9:</u> Process Selection • Four Process Strategies • Process analysis and design • Designing Product Layouts • Process redesign	Chapter 6 of **Operations Management**, 12th ed., by William J Stevenson	Summarize key concepts and theories (CLO 1)
	<u>Lecture 10:</u> Research Paper 1: Application of Pareto analysis and cause and effect diagram Students are expected to have gone through the research paper before coming to the class, where discussion will take place.		Apply operations management tools and techniques (CLO 2)
6	<u>Lecture 11 & 12:</u> Theory of constraint • Capacity • Bottleneck Analysis and the Theory of Constraints • Break-even Analysis • Applying Expected Monetary	Supplement 7 of ***Principles of Operations Management*** *11th ed.* by *Heizer*	Identify supply chain components and resources (CLO 1)

	Value to Capacity Decisions		
Week	Lecture No. and Topic	Preparation Material	Session Outcomes (Students should be able to…)
7	Lecture 13: Location Strategy • Strategic importance of location • Methods of Evaluating Location Alternatives • Locational Cost–Volume Analysis	Chapter 8 of **Operations Management**, 12th ed., by William J Stevenson	Identify supply chain components and resources (CLO 1)
	Lecture 14: Mid review of project (2 Pager Report + 5 min PPT) • Project introduction • what has been achieved • what will be achieved in this project (Deliverables must be provided) • Communicate their progress while selecting their problem • Selecting the correct tool to solve that problem.		Evaluate customized solutions (CLO 4)
8	Lecture 15 & 16: Layout Strategies • Facility Layout management • Work Cells • Line balancing • Cycle Time, Lead Time • Takt time, Process Time	Chapter 8 of **Operations Management**, 12th ed., by William J Stevenson	Summarize key concepts and theories (CLO 1)
	Lecture 16: Case study 1: Gati Achieving Quality Excellence In Shipment Delivery (**Harvard Business Publishing)** Students are expected to have gone through the case study before coming to the class, where discussion will take place.		Apply operations management tools and techniques (CLO 2)
9	**MID-TERM EXAM WEEK**		
10	Lecture 17 & 18: Work Design and Measurement • Components of Job Design • Motion study • Work measurement • Labor planning • Labor Work schedules • Ergonomics and work environment	Chapter 7 of **Operations Management**, 12th ed., by William J Stevenson Chapter 10 of ***Principles of Operations Management*** *11th ed.* by *Heizer*	Summarize key concepts and theories (CLO 1)

Week	Lecture No. and Topic	Preparation Material	Session Outcomes (Students should be able to…)
11	Lecture 19 & 20: Material Requirement Planning & ERP • Master Production Schedule • MRP Structure • Bill of material • Lot-sizing techniques • ERP in service sector	Chapter 12 of **Operations Management**, 12th ed., by William J Stevenson	Apply operations management tools and techniques (CLO 2)
12	Lecture 21: Short- Term Scheduling • Importance of Short term scheduling • Scheduling process focused facilities • Loading Jobs	Chapter 15 of **Operations Management**, 12th ed., by William J Stevenson Chapter 16 of ***Principles of Operations Management*** *11th ed.* by *Heizer*	Summarize key concepts and theories (CLO 1)
	Lecture 22: Research Paper 2: Scheduling in Manufacturing Students are expected to have gone through the research paper before coming to the class, where discussion will take place.		Apply operations management tools and techniques (CLO 2)
13	Lecture 23 & 24: Short Term Scheduling (continued) • Scheduling in Low-Volume Systems • Sequencing Jobs • Sequencing Jobs through Two Work Centers (John's Rule) • Cyclical Scheduling	Chapter 15 of **Operations Management**, 12th ed., by William J Stevenson Chapter 16 of ***Principles of Operations Management*** *11th ed.* by *Heizer*	Apply operations management tools and techniques (CLO 2)
14	Lecture 25: JIT and Lean Operations • The Toyota Approach • Lean tools • Lean and Just-in-Time • Six sigma	Chapter 14 of **Operations Management**, 12th ed., by William J Stevenson	Apply operations management tools and techniques (CLO 2)
	Lecture 26: Case 2: Toyota's Production System (**Harvard Business Publishing)** Students are expected to have gone through the case study before		Analyze service/ production challenges in operations (CLO 3)

	coming to the class, where discussion will take place.		
Week	Lecture No. and Topic	Preparation Material	Session Outcomes (Students should be able to…)
15	Lecture 27: Value stream mapping & 5W2H • Value stream mapping • Process Improvement Using 5W2H	**Instructor notes and class exercises**	Analyze service/ production challenges in operations (CLO 3)
	Lecture 28: Sustainable Operations Management • Design and Production for Sustainability • Design for disassembly • Green Manufacturing and Sustainability at Frito-Lay (video case)	Supplement Chapter 7 of *Operations Management* by *Heizer*	Apply operations management tools and techniques (CLO 2)
16	Lecture 29 & 30: Project Presentation **Report:** Problem identification, tools used, solution (respective problem) for an OM Project, references, figures. **Presentation:** Content + Comprehensive coverage of topic, Knowledge about project, Confidence & Preparation, Presentation effort, Interaction with class, Dressing		Evaluate customized solutions (CLO 4)
17	**BUFFER WEEK (if required)**		
18	**FINAL EXAM WEEK**		