MEC7234: Manufacturing Modelling and Analysis

Hours per semester				Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment Mark	Credit Units
LH	PT	TH	CH	WTM	WEM	WCM	CU
45	00	00	45	100	60	40	3

Course Description

This course covers a broad range of techniques and tools relevant to the design, analysis, development, implementation, operation and control of modern manufacturing systems. A significant portion of the coursework involves a group project with industry.

Course objectives

To present the knowledge of key drivers of manufacturing system performance, how lead time reduction can drive improvements throughout the enterprise, and familiarity with common techniques and tools for manufacturing system analysis. It also presents how to conduct a manufacturing improvement project while working in a team environment.

Learning Outcomes

At the end of the course, students should be able to:

1. Describe the basics about design, control, and planning of discrete manufacturing systems
2. Analyze and design manufacturing systems by quantitative models
3. Carry out procedures that can lead to improvements in a malfunctioning manufacturing systems

Course Content

Introduction to modern manufacturing strategy and the importance of Quick Response manufacturing	(3hours)
Implementing quick response in production.	(2 hours)
Structured methodology to conduct a manufacturing improvement project.	(3hours)
Creating a goals document.	(2 hours)
Impact of lot sizes and capacity planning.	(2 hours)
MRP in the modern manufacturing context.	(4 hours)
Supplier and Customer strategies.	(3 hours)
Rapid new product introduction.	(2 hours)
Management mindset and performance measures.	(2 hours)
Tools for manufacturing system analysis.	(4 hours)
Manufacturing process simulation and analysis	(14 hours)
Steps to implementing changes and improvements.	(4 hours)

Course delivery

In this course, students are instructed on methods of treating quantitative models for design, redesign, control and planning of discrete manufacturing systems. Assignments have a

research character and explore the state of the art on those topics. During this part, the course provides experience with teamwork, specifically, participating in a team-based real-world project.

Method of Assessment

Assessment will be done through coursework which will include assignments, classroom and home tests, project work and presentations project presentations and the final project report, and a written examination. Coursework will carry a total of 40% and written examination carries 60%. Coursework marks will be divided into: Assignments 5%,, Tests 10% and Project work 25%.

Reading list/references

1. Bin Wu Manufacturing Systems Design and Analysis: Context and Techniques. Springer; 2nd Revised edition edition (30 Sep 1994) ISBN-10: 9780412581403
2. Guy L. Curry and Richard M. Feldman Manufacturing Systems Modeling and Analysis. Second Edition. Springer-Verlag: ISBN # 978-3-642-16617-4
3. Wallace Hopp, Mark Spearman (2007) Factory Physics: Foundations of Manufacturing Management. McGraw-Hill/Irwin; 3 edition ISBN-10: 0072824034
4. Guy L. Curry and Richard M. Feldman (2010) Manufacturing Systems Modeling and Analysis Springer; 2nd Edition. edition eBook. | ISBN: 3642166172