COURSE OUTLINE: MCH501 - ENG. OPERATIONS MAN.

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Course Code: Title	MCH501: ENGINEERING OPERATIONS MANAGEMENT
Program Number: Name	4043: MECH ENG. TECHNOLOGY
Department:	MECHANICAL TECHNIQUES PS
Academic Year:	2024-2025
Course Description:	In this course students will learn concepts required to design and operate competitive manufacturing/industrial systems. Topics include product-production design interaction, facilities location and layout, material handling, work measurement, financial compensation, human factors, operations planning and control, quality control, linear programming, inventory control, and project management.
Total Credits:	4
Hours/Week:	4
Total Hours:	56
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4043 - MECH ENG. TECHNOLOGY** VLO 1 Monitor compliance with current legislation, standards, regulations and guidelines. VLO 2 Plan, co-ordinate, implement and evaluate quality control and quality assurance procedures to meet organizational standards and requirements. VLO 3 Monitor and encourage compliance with current health and safety legislation, as well as organizational practices and procedures. VLO 4 Develop and apply sustainability best practices in workplaces. VLO 5 Use current and emerging technologies to implement mechanical engineering projects. VLO 6 Analyze and solve complex mechanical problems by applying mathematics and fundamentals of mechanical engineering. VLO 8 Design and analyze mechanical components, processes and systems by applying fundamentals of mechanical engineering. VLO 13 Apply business principles to design and engineering practices.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems.

	EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	
Other Course Evaluation & Assessment Requirements:	Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00 F (Fail)49% and below 0.00 CR (Credit) Credit for diploma requirements has been awarded. S Satisfactory achievement in field /clinical placement or non-graded subject area. U Unsatisfactory achievement in field/clinical placement or non-graded subject area. X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. NR Grade not reported to Registrar`s office. W Student has withdrawn from the course without academic penalty.
Books and Required Resources:	Operations Management (Canadian Edition) by Stevenson, Hojati and Cao Publisher: McGraw Hill Ryerson Edition: 5th ISBN: 9781259088063

Course Outcomes and Learning Objectives:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
1.Identify, define and discuss elements of Industrial Engineering	1.1. Define the term industrial engineering and identify industrial engineering roles. 1.2. Identify the three major functional areas of organizations and describe how they interrelate. 1.3. Briefly describe the historical evolution of industrial engineering. 1.4. Identify current trends that affect industrial engineering.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2.Identify, define and discuss Competition, Planning and Demand Forecasting as it relates to Industrial Engineering.	2.1. List and briefly discuss the primary ways that organizations compete. 2.2. Describe a company`s strategic planning, mission/vision/values, strategies, operations strategy, and list steps involved in formulating an operations strategy. 2.3 Define and measure the term productivity, evaluate Canada`s productivity, describe factors affecting productivity.

	2.4. Identify uses of demand forecasts, distinguish between forecasting time frames, describe common features of forecasts, list the elements of a good forecast and steps of forecasting process, and contrast different forecasting approaches.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3.Utilize System Design concepts and understand their effects on operational efficiency, quality and profitability.	3.1 Describe the product design process and define key issues in product design. 3.2 Describe the basic production process types and discuss various automated and manual production methods. 3.3 Describe steps of production process design, draw process flow diagrams, describe the basic plant/facility layout types and develop simple process layouts. 3.4 Solve simple assembly line balancing problems. 3.5 Briefly describe efficiency and behavioural approaches to job design. 3.6 Explain the purpose of methods analysis and describe how methods analysis is performed. 3.7 Describe time study methods and perform calculations. 3.8 Discuss the impact of working conditions and various compensation methods on job design. 3.9 Explain the nature and importance of location decisions, outline the decision process for making these kinds of decisions, describe major factors that affect location decisions, and evaluate location alternatives.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4.Define various aspects of a Quality Management System and describe their effect on product quality, production efficiency, profitability and safety.	4.1. Define the term quality, describe evolution of quality management, discuss dimensions and determinants of quality, describe various costs associated with quality, and discuss quality philosophies. 4.2. Describe ISO 9001 and apply its concepts. 4.3. Describe HACCP and apply its concepts. 4.4. Describe and Canada Awards for Excellence and TQM and apply their concepts. 4.5. Give an overview of problem solving and process improvement, describe and use various quality tools
Course Outcome 5	**Learning Objectives for Course Outcome 5**
5.Describe and define Supply Chain Management, Inventory Control and Operations Planning and apply their concepts to typical problems.	1. Define the term inventory, list major reasons for holding inventory, discuss the objectives of inventory management, list the main requirements of effective inventory management, and describe A-B-C classification and perform it. 2. Describe the basic EOQ model, the economic production quantity model, the quantity discount model, and the planned shortage model and solve typical problems. 3. Describe how to determine the reorder point, fixed order interval, utilize single period model to solve typical problems. 4. Explain what sales and operations planning and aggregate operations planning are, and identify the variables and strategies used in aggregate production planning.

	5. Explain what master production scheduling is and how it is performed. 6. Describe Material Requirements Planning (MRP), the conditions under which it is most appropriate, and the inputs to an effective MRP. 7. Explain what is meant by the terms just-in-time (JIT) and lean production. 8. Describe those aspects of product design and process design that are important for lean production. 9. Explain what are job and staff scheduling, discuss and use commonly used priority rules and performance measures for sequencing/scheduling, and perform sequencing/scheduling of two work centers and setup dependent cases.

Course Outcome 6	**Learning Objectives for Course Outcome 6**
6.Define and utilize project management roles and concepts to manage engineering projects.	1. Describe what a project is, and discuss the nature of a project manager`s job. 2. Describe what is involved in project planning, explain how to manage project risks, and what work breakdown structure is. 3. Utilize Gantt charts to assist in project scheduling, and define PERT/CPM and precedence networks. 4. Describe what is involved in project execution and control, and explain what earned value is. 5. Formulate a linear programming model from the description of a problem, solve two-variable linear programming problems using the graphical method, do sensitivity analysis on the solution of a linear programming problem 6. Describe and solve the transportation problem, and assignment problems. 7. Describe the system characteristics and measures of performance in waiting-line analysis

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	35%
Final Exam	35%
Participation	10%
Tests and Quizzes	20%

Date: November 12, 2024

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.