



## COURSE OUTLINE: RAA104 - MANUFACTURING PROC

Prepared: Donovan Kennedy

Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	RAA104: MANUFACTURING PROCESSES
<b>Program Number: Name</b>	4073: ROBOTICS & AUTOMATIO
<b>Department:</b>	ROBOTICS GRADUATE CERTIFICATE
<b>Academic Year:</b>	2023-2024
<b>Course Description:</b>	The students in this course will gain an understanding of typical processes used in various manufacturing environments and the arguments for and against introducing automation into these environments. Students will be introduced to the concepts of design for assembly, return on investment (ROI), mean time between failure (MTF), lead time and several other topics as they relate to automation and robotics used in industry
<b>Total Credits:</b>	3
<b>Hours/Week:</b>	3
<b>Total Hours:</b>	42
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>This course is a pre-requisite for:</b>	RAA204
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4073 - ROBOTICS &amp; AUTOMATIO</b>
Please refer to program web page for a complete listing of program outcomes where applicable.	VLO 3 Collaborate with health and safety personnel to develop plans and specifications that incorporate, among other elements, safety controls and physical guarding to comply with all applicable regulatory safety designs and standards used in industrial robotic applications.
	VLO 4 Assist in the assessment and management of robotic systems by applying business principles to the electromechanical environment.
	VLO 6 Integrate budgetary, technical, functional and safety considerations in the design and optimization of custom automation solutions.
<b>Essential Employability Skills (EES) addressed in this course:</b>	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 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.



	<p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p>								
<b>Course Evaluation:</b>	<p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.</p>								
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	<p>Grade            Definition Grade Point Equivalent            A+ 90 - 100% 4.00            A 80 - 89% 4.00            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.</p> <p>Smart watches, smart phones and similar devices are not allowed during tests or quizzes and must be removed. Smart phones are not acceptable for use as a calculator during a test or quiz.</p>								
<b>Books and Required Resources:</b>	<p>Manufacturing Engineering Handbook, Second Edition by Hwaiju Geng            Publisher: McGraw-Hill Education Edition: Second            ISBN: 978-0-07-183977-8            Available from Online Resources</p>								
<b>Course Outcomes and Learning Objectives:</b>	<table border="1"> <thead> <tr> <th><b>Course Outcome 1</b></th> <th><b>Learning Objectives for Course Outcome 1</b></th> </tr> </thead> <tbody> <tr> <td>1. Investigate different manufacturing processes as they pertain to automation, specifically robotics</td> <td>           1.1 Identify and explain various processes used in manufacturing facilities            1.2 Give examples of processes that would benefit from implementation of automation            1.3 Investigate case studies of successful and unsuccessful implementations of automation            1.4 Debate reasons for and against implementation of automation         </td> </tr> <tr> <th><b>Course Outcome 2</b></th> <th><b>Learning Objectives for Course Outcome 2</b></th> </tr> <tr> <td>2. Investigate concepts of Automated Manufacturing</td> <td>           2.1 Review design for assembly concepts            2.2 Identify the differences between fixed (hard), programmable and flexible automation            2.3 Examine relationships between production facilities and         </td> </tr> </tbody> </table>	<b>Course Outcome 1</b>	<b>Learning Objectives for Course Outcome 1</b>	1. Investigate different manufacturing processes as they pertain to automation, specifically robotics	1.1 Identify and explain various processes used in manufacturing facilities 1.2 Give examples of processes that would benefit from implementation of automation 1.3 Investigate case studies of successful and unsuccessful implementations of automation 1.4 Debate reasons for and against implementation of automation	<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>	2. Investigate concepts of Automated Manufacturing	2.1 Review design for assembly concepts 2.2 Identify the differences between fixed (hard), programmable and flexible automation 2.3 Examine relationships between production facilities and
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	products
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
3. Examine cost benefit analysis of automation	3.1 Investigate manual vs. automated costs for a typical manufacturing environment 3.2 Investigate concepts such as lead-time, mean-time between failure and other production planning concepts
<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
4. Investigate various manufacturing transport systems and automated storage systems (ASRS)	4.1 Examine various types and components to automated systems 4.2 Analyze different automated storage and retrieval systems and how they are used in production environments 4.3 Examine various automated inspection technologies

**Evaluation Process and Grading System:**

<b>Evaluation Type</b>	<b>Evaluation Weight</b>
Assignments	20%
Case Study / Project	20%
Participation	10%
Written Exam 1	25%
Written Exam 2	25%

**Date:**

May 30, 2023

**Addendum:**

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

