



COURSE OUTLINE: AMF201 - ROBOTICS IN MANUFACT

Prepared: Donovan Kennedy

Approved: Corey Meunier, Chair, Technology and Skilled Trades

Course Code: Title	AMF201: ROBOTICS IN MANUFACTURING
Program Number: Name	4069: AUTOMATED MANUFACT.
Department:	ROBOTICS GRADUATE CERTIFICATE
Semesters/Terms:	21W
Course Description:	The students in this course will gain the understanding of robotics as it applies to the production and assembly processes. The basic principles of robotics will be introduced using ABB RobotStudio for simulation and real world using teach pendant programming. Students will also be exposed to specific process commands and various programming languages.
Total Credits:	6
Hours/Week:	6
Total Hours:	90
Prerequisites:	AMF101
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course:	4069 - AUTOMATED MANUFACT. VLO 1 Solve automated manufacturing problems found in a typical industrial environment by applying engineering principles and decision-making strategies. VLO 3 Select and manage appropriate hardware and software for the creation of engineering designs. VLO 4 Identify and utilize manufacturing processes, rapid prototyping methods, and automation technologies to optimize product development. VLO 6 Configure, control, monitor, and evaluate automated manufacturing components and systems to improve automated manufacturing systems and maintain quality control measures in response to industry needs and requirements. VLO 7 Exercise professionalism, leadership, and effective communication in an industrial work setting to increase overall productivity and support a positive work environment. VLO 8 Ensure automation equipment is in compliance with established operating procedures, and occupational health and safety regulations.
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 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.

Please refer to program web page for a complete listing of program outcomes where applicable.

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2020-2021 academic year.



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	EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. 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:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.								
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. Students must pass both the theory portion and the lab portion of the course including the practical test to receive a passing grade in the course. 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.								
Books and Required Resources:	Manufacturing Engineering Handbook by Hwaiyu Geng Publisher: McGraw-Hill Education Edition: Second ISBN: 978-0-07-183977-8								
Course Outcomes and Learning Objectives:	<table border="1"> <thead> <tr> <th>Course Outcome 1</th><th>Learning Objectives for Course Outcome 1</th></tr> </thead> <tbody> <tr> <td>1. Illustrate safe practices in the lab environment as well as in typical automation and manufacturing environments.</td><td> 1.1 Explain the different safety practices that should be implemented in automation and manufacturing cells. 1.2 Investigate safety devices used in the lab at Sault College </td></tr> <tr> <th>Course Outcome 2</th><th>Learning Objectives for Course Outcome 2</th></tr> <tr> <td>2. Explain the basics of robot hardware and software</td><td> 2.1 List the different types of robots. 2.2 Understand the right-hand rule and Cartesian coordinate systems. 2.3 List the different types of robot motion and termination </td></tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	1. Illustrate safe practices in the lab environment as well as in typical automation and manufacturing environments.	1.1 Explain the different safety practices that should be implemented in automation and manufacturing cells. 1.2 Investigate safety devices used in the lab at Sault College	Course Outcome 2	Learning Objectives for Course Outcome 2	2. Explain the basics of robot hardware and software	2.1 List the different types of robots. 2.2 Understand the right-hand rule and Cartesian coordinate systems. 2.3 List the different types of robot motion and termination
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	Course Outcome 3	Learning Objectives for Course Outcome 3												
	3. Understand the different applications of robotics in automated manufacturing and their interfacing.	3.1 Describe methods of material handling 3.2 Describe methods of robotic processes including: welding, dispensing, material removal, etc. 3.3 Explain the different robotic equipment and commands associated with various manufacturing processes. 3.4 Explain robotic interference zones.												
	Course Outcome 4	Learning Objectives for Course Outcome 4												
	4. Operate ABB robot using the FlexPendant and RobotStudio	4.1 Examine programming structure used in RAPID 4.2 List file structure of ABB robots 4.3 Examine FlexPendant sub-menus 4.4 Examine RobotStudio sub-menus 4.5 Open and connect to robot through RobotStudio 4.6 Create, save, backup, etc., a new program using the FlexPendant and RobotStudio												
	Course Outcome 5	Learning Objectives for Course Outcome 5												
	5. Understand different robot programming languages.	5.1 Describe the programming languages used with various industrial robots. 5.2 Describe how different programming languages work with various manufacturing processes. 5.3 List the advantages and disadvantages of various robotic programming languages when comparing them to ease of offline programming and the ability for complex operations.												
Evaluation Process and Grading System:	<table><tr><th>Evaluation Type</th><th>Evaluation Weight</th></tr><tr><td>Assignments & Labs</td><td>30%</td></tr><tr><td>Attendance & Participation</td><td>10%</td></tr><tr><td>Lab Practical Test</td><td>20%</td></tr><tr><td>Written Test #1</td><td>20%</td></tr><tr><td>Written Test #2</td><td>20%</td></tr></table>		Evaluation Type	Evaluation Weight	Assignments & Labs	30%	Attendance & Participation	10%	Lab Practical Test	20%	Written Test #1	20%	Written Test #2	20%
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Date:	June 11, 2020													
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.													

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