Prepared: Dean Matthews Approved: Corey Meunier

Course Code: Title	RAA200: ADVANCED ROBOTICS PROGRAMMING
Program Number: Name	4068: ROBOTICS AUTOMATION
Department:	ROBOTICS GRADUATE CERTIFICATE
Semester/Term:	18W
Course Description:	The objective of this course is to continue the study of programming ABB robots and to investigate advanced topics such as the use of tool centre points (TCP), base frames, advanced file handling and application programming.
Total Credits:	5
Hours/Week:	5
Total Hours:	75
Prerequisites:	RAA100, RAA103, RAA106
Vocational Learning Outcomes (VLO's): **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4068 - ROBOTICS AUTOMATION** #1. Construct and evaluate robotic control programs for various scenarios against which to model the functionality and stability of automation systems. #2. Plan and lead the installation of new industrial equipment and its physical and digital integration with existing systems. #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. #5. Validate and optimize the functioning of motor, drive, control, and robotic systems. #7. Formulate and use a variety of troubleshooting techniques on new and legacy electromechanical equipment, processes, systems and subsystems.
Essential Employability Skills (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. #2. Respond to written, spoken, or visual messages in a manner that ensures effective communication. #3. Execute mathematical operations accurately. #4. Apply a systematic approach to solve problems. #5. Use a variety of thinking skills to anticipate and solve problems. #6. Locate, select, organize, and document information using appropriate technology and information systems.

	#7. Analyze, evaluate, and apply relevant information from a variety of sources. #9. Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. #10. Manage the use of time and other resources to complete projects. #11. Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D
Evaluation Process and Grading System:	<table><tr><th>Evaluation Type</th><th>Evaluation Weight</th></tr><tr><td>Assignments</td><td>10%</td></tr><tr><td>Lab practical</td><td>25%</td></tr><tr><td>Project writeup</td><td>25%</td></tr><tr><td>Test 1</td><td>20%</td></tr><tr><td>Test 2</td><td>20%</td></tr></table>
Books and Required Resources:	Automation, Production Systems, and Computer-Integrated Manufacturing by Mikell P. Groover Publisher: Pearson Edition: Fourth ISBN: 978-0-13-349961-2
Course Outcomes and Learning Objectives:	**Course Outcome 1.** Investigate TCP`s and how they are used in application programming **Learning Objectives 1.** Interpret why TCPs are used in robot applications Explain how to teach a TCP using FlexPendant Demonstrate implementation of TCP in a robot program **Course Outcome 2.** Investigate base frames and how they are used in application programming **Learning Objectives 2.** Interpret why base frames and work objects are used in robot applications Explain how to teach a base frame and using FlexPendant Demonstrate TCP and base frames in robot motion **Course Outcome 3.** Investigate interrupts and trap routines **Learning Objectives 3.** Investigate asynchronous scenarios where interrupts are needed Examine how trap routines are used in Rapid programming Demonstrate how to use an interrupt in a robot program

	Course Outcome 4. Investigate the use of other Advanced functions **Learning Objectives 4.** Examine why searches are used in robot applications Demonstrate how to use a search in a robot program Examine World zones **Course Outcome 5.** Investigate advanced system and file handling **Learning Objectives 5.** Illustrate system backup and restore procedures Examine how to reload a new system onto an ABB controller Illustrate file structure of ABB controller
Date:	Monday, December 18, 2017
	Please refer to the course outline addendum on the Learning Management System for further information.