COURSE OUTLINE

RAA100

Prepared: Dean Matthews   Approved: Corey Meunier

Course Code: Title	RAA100: INTRODUCTION TO ROBOTICS
Program Number: Name	4068: ROBOTICS AUTOMATION
Department:	ROBOTICS GRADUATE CERTIFICATE
Semester/Term:	17F
Course Description:	The objective of this course is to introduce students to industrial robots used in manufacturing facilities. The emphasis will be on proper safety practices when using robots in our labs as well as in industry. The students will familiarize themselves with our ABB robots as well as the teach pendant and controller in order to safely manipulate it during laboratory exercises. The students will be introduced to ABB Robot Studio as well as the file structure used to create programs on the robot controller
Total Credits:	5
Hours/Week:	5
Total Hours:	75
This course is a pre-requisite for:	RAA200, RAA201, RAA202, RAA203, RAA204
Vocational Learning Outcomes (VLO's): **Please refer to program web page for a complete listing of program outcomes where applicable.**	#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. #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.

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#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:

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	10%
Lab practical	25%
Project writeup	25%
Test 2	20%
Test 1	20%

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.

Illustrate safe practices in our lab environment as well as in typical manufacturing environments

Learning Objectives 1.

Explain the different safety practices that should be implemented in robotic cells
Investigate safety devices used in our lab
Examine case studies of proper and improper robotic implementations as it pertains to safety

Course Outcome 2.

Examine typical robotic applications used in various manufacturing environments

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Learning Objectives 2.

List types of robotic applications (palletizing, welding, painting, material handling, etc…)
Examine types of end effectors used in different robot applications
Identify different parts of robot hardware and software

Course Outcome 3.

Explain basics of robot hardware and software

Learning Objectives 3.

List steps to enable robot motion
Understand the right-hand rule and Cartesian coordinate system
List different types of robot motion and termination types

Course Outcome 4.

Operate ABB Flex-pendant and Robot Studio

Learning Objectives 4.

Examine programming structure used in Rapid
List file structure of ABB robots
Examine Flex-pendant sub-menus
Examine Robot Studio sub-menus
Open and connect to robot through Robot Studio
Create, save, backup, etc… a new program using pendant

Course Outcome 5.

Create a robot program to perform a task

Learning Objectives 5.

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	Practice programming ABB robot using the Flex-pendant and Robot Studio to do simple tasks Applying prior knowledge to create a program and download to robot and run program. Introduce concepts surrounding how TCP and Base frames are used in programming
Date:	Friday, September 1, 2017
	Please refer to the course outline addendum on the Learning Management System for further information.