



# COURSE OUTLINE

## RAA102

Prepared: Mark Allemang and Ron Chartrand Approved: Corey Munier

<b>Course Code: Title</b>	RAA102: COMPUTERS AND NETWORKING						
<b>Program Number: Name</b>	4068: ROBOTICS AUTOMATION						
<b>Department:</b>	ROBOTICS GRADUATE CERTIFICATE						
<b>Semester/Term:</b>	17F						
<b>Course Description:</b>	This course covers communication networks used in the automation industry and focuses on various fieldbus communications of main and peripheral equipment.						
<b>Total Credits:</b>	2						
<b>Hours/Week:</b>	2						
<b>Total Hours:</b>	30						
<b>This course is a pre-requisite for:</b>	RAA202, RAA203, RAA204						
<b>Vocational Learning Outcomes (VLO's):</b>  Please refer to program web page for a complete listing of program outcomes where applicable.	#2. Plan and lead the installation of new industrial equipment and its physical and digital integration with existing systems.						
<b>Essential Employability Skills (EES):</b>	#4. Apply a systematic approach to solve problems.						
<b>Course Evaluation:</b>							
<b>Evaluation Process and Grading System:</b>	<table border="1"> <thead> <tr> <th>Evaluation Type</th> <th>Evaluation Weight</th> </tr> </thead> <tbody> <tr> <td>Assignments</td> <td>20%</td> </tr> <tr> <td>Tests</td> <td>80%</td> </tr> </tbody> </table>	Evaluation Type	Evaluation Weight	Assignments	20%	Tests	80%
Evaluation Type	Evaluation Weight						
Assignments	20%						
Tests	80%						
<b>Course Outcomes and Learning Objectives:</b>	<p><b>Course Outcome 1.</b></p> <p>Utilize various Basic Terminology, and describe the Concepts of a Computer Network</p>						



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### **Learning Objectives 1.**

- Define a network
- Define and distinguish LAN, WAN, CAN, MAN
- Compare and contrast various types of networks including client/server, peer to peer
- Describe the term NOS network operating systems
- Describe physical topologies (bus,ring,star), and associated media access control methods (logical topology)
- Compare circuit switching and packet switching
- Differentiate simplex, full/half duplex
- List and describe the 7 layers of the OSI model and
- Compare them to the 4 layers of the TCP/IP model
- Identify various protocols at each layer and describe their purpose
- Identify the method of addressing at various layers and the associated protocol data units
- Identify the network devices at various layers and describe their role in the network.
- List the advantages of industrial networked computing relative to islands of automation
- Identify, List and describe the elements of an industrial/Robotic network
- Explain Basic Industrial/Robotic Network Terminology and Concepts
- Describe several specific uses for Industrial networks
- Identify and Distinguish between different Data communications standards such as, RS-232 interface standard, RS-485 interface standard
- State the importance of the ISO OSI model and how it applies to the Industrial/Robotic Networks discussed in this course

### **Course Outcome 2.**

Describe the characteristics of Ethernet IP based networks

### **Learning Objectives 2.**

- State the application advantages and limitations of Industrial Ethernet in today's modern industries
- Describe how industrial Ethernet-IP systems operate
- Compare wired to wireless industrial networking
- Identify Industrial Ethernet-IP Network cable types and uses
- Identify Industrial Ethernet-IP Network troubleshooting
- Describe the terms Electrical Coupling Grounding and Shielding as they applies to Industrial



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networks.

### **Course Outcome 3.**

Describe the characteristics of Device Net based networks.

### **Learning Objectives 3.**

- Identify Devicenet Applications and place in in a typical plant Hierarchy
- Identify Frame Format and Network Characteristics
- Identify Devicenet Configuration and Network Components
- Explain Devicenet Addressing and Topology
- Discuss Installation ,commissioning and troubleshooting
- Identify the Types & Media characteristics

**Date:**

Friday, August 18, 2017

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