Prepared: Mark Allemang and Ron Chartrand Approved: Corey Munier

Course Code: Title	RAA102: COMPUTERS AND NETWORKING
Program Number: Name	4068: ROBOTICS AUTOMATION
Department:	ROBOTICS GRADUATE CERTIFICATE
Semester/Term:	17F
Course Description:	This course covers communication networks used in the automation industry and focuses on various fieldbus communications of main and peripheral equipment.
Total Credits:	2
Hours/Week:	2
Total Hours:	30
This course is a pre-requisite for:	RAA202, RAA203, RAA204
Vocational Learning Outcomes (VLO's): **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.
Essential Employability Skills (EES):	#4. Apply a systematic approach to solve problems.
Course Evaluation:	
Evaluation Process and Grading System:	

Evaluation Type	Evaluation Weight
Assignments	20%
Tests	80%

Course Outcomes and Learning Objectives:

Course Outcome 1.

Utilize various Basic Terminology, and describe the Concepts of a Computer Network

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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, September 1, 2017
	Please refer to the course outline addendum on the Learning Management System for further information.