


Full Title	Industrial Automation 1		
Status	Uploaded to Banner	Start Term	2012
NFQ Level	06	ECTS Credits	10
Module Code	ENGI06004	Duration	Stage - (26 Weeks)
Grading Mode		Department	Building & Civil Engineering
Module Author	Ray Weldon		

Module Description

This module will provide the student with practical knowledge Electrical Control Systems, beginning with basic control of motors and progressing throughout the course with more complicated types of control.

Learning Outcomes	
	<i>On completion of this module the learner will/should be able to:</i>
1.	Select and install the panel wiring cables, accessories and protective devices required for 'direct on line', 'forward/reverse' 'star/delta' and sequence starting of motors.
2.	Install a safety relay circuit incorporating an emergency stop.
3.	Develop and interpret schematic diagrams of the listed motor power and control circuits.
4.	Install a soft start controller on a three phase motor and identify suitable applications.
5.	Install a thermistor relay on a direct-on-line motor control circuit.
6.	Fault find on various motor control exercises utilising schematic drawings, test instruments and manufacturers' technical data.
7.	Describe the operation and layout of various PLC systems
8.	Select input/output modules for a given application
9.	Read and interpret basic ladder diagrams/statement lists on a programmable console.
10.	Assemble and wire a PLC system using a number of inputs and outputs. Install programmes and test for function.
11.	Back up a PLC program on hard disk or diskette/usb drive.

Indicative Syllabus

- 1. Industrial safety:** House rules, safe practice, safety precautions, workshop safety, accidents reports, first aid, electric shock treatment.
 - 2. Wiring Systems:** Basic wiring, accessories, circuits, cable selection, testing equipment, trunking/conduit installation, earthing and testing.
 - 3. Hard Wired Control Systems:** International symbols, Wiring and schematic control circuits, relay logic, interlocking, starting methods, motor control, fault finding, diagnostics.
 - 4. Programmable Controller Hardware:** Architecture, Central Processor Unit, Memory, Input/output modules, Programming Units, Modular Systems.
 - 5. Programming Of PLC Systems:** Ladder language, List language, System flow chart, Standard PLC functions and Features e.g. timers, counters, special function relays, Fault finding.
 - 6. System Operation and Programming Techniques:** PLC systems, Modes of operation, Program scanning, Connection of peripherals, Monitoring/Diagnostics.
- Laboratory Exercises:-** These will include:

Install the cables, accessories and protective devices required for 'direct-on-line' starting of single and three phase motors.

Install the control circuits required for stop/start, emergency stop, hand-off/automatic and sequential applications.

Install the circuits required for 'power on', 'motor run' and 'overload trip' indication.

Develop and interpret schematic diagrams if the listed motive power, control and indicator circuits.

Diagnose and fault find a variety of control circuits.

Perform and record the results of mechanical and electrical tests on motors and fix, align and couple motors to loads.

Teaching and Learning Strategy

,

Assessment Strategy

Over the year long course the student will be continuously assessed in the Lab/workshop on the learning outcomes.

Repeat Assessment Strategies

,

Indicative Coursework and Continuous Assessment:		50 %		
Form	Title	Percent	Week (Indicative)	Learning Outcomes
UNKNOWN	Class Assessment Assessment	50 %	OnGoing	1,2,3,4,5,6,7,8,9,10,11

End of Semester / Year Formal Exam:		50 %		
Form	Title	Percent	Week (Indicative)	Learning Outcomes
UNKNOWN	Final Exam Written Examination	50 %	End of Term	1,2,3,4,5,6,7,8,9,10,11

Full Time Delivery Mode Average Weekly Workload:			5.00 Hours		
Type	Description	Location	Hours	Frequency	Weekly Avg
Lecture	Calss Lecture	Flat Classroom	2	Weekly	2.00
Practical	Workshop Exercises	Engineering Laboratory	3	Weekly	3.00

Literary Resources

Ridley, John (2010) *Programmable Logic Controllers (Application and Programming)* Amsterdam, Newnes.

Zhang, Peng. (2008) *Industrial Control Technology: A Handbook for Engineers and Researchers*, New York, Williams Andrew.

Collins, D. and Lane, E. (1997) *Programmable Controllers (A Practical Guide)* London, McGraw-Hill.

Hughes, Austin. (2009) *Electric Motors and Drives (Fundamentals, Types and Applications)* Oxford UK, Newnes,

Other Resources

None

Additional Information

None

Programme Membership

GA_EINAG_S07 201200 Certificate in Industrial Automation

