Prepared: Mark Allemang Approved: Corey Meunier

Course Code: Title	ELN340: EMBEDDED MICROCONTROLLERS II
Program Number: Name	4029: ELECTRICAL TY-PROCES
Department:	ELECT./INSTRUMENTATION PS
Semester/Term:	18W
Course Description:	This is an application course which will employ embedded microcontrollers and associated hardware to solve more advanced computer interfacing problems.
Total Credits:	4
Hours/Week:	3
Total Hours:	45
Prerequisites:	ELN331, ELN335
Vocational Learning Outcomes (VLO's): **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4029 - ELECTRICAL TY-PROCES** #8. Use computer skills and tools to solve a range of electrical related problems.
Essential Employability Skills (EES):	#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.
Course Evaluation:	Passing Grade: 50%, D
Other Course Evaluation & Assessment Requirements:	Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00

C 60 - 69% 2.00
D 50 - 59% 1.00
F (Fail)49% and below 0.00

CR (Credit) Credit for diploma requirements has been awarded.
S Satisfactory achievement in field /clinical placement or non-graded subject area.
U Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR Grade not reported to Registrar`s office.
W Student has withdrawn from the course without academic penalty.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Project Execution (function and on time)	35%
Project Specification and Documentation	35%
Tests	30%

Books and Required Resources:

Arduino Microcontroller
Student will be required to provide their own Arduino Uno Microcontroller

Course Outcomes and Learning Objectives:

Course Outcome 1.

Write assembly language programs for a microcontroller given specific requirements.

Learning Objectives 1.

Develop algorithms and write source code in assembly language for an embedded microcontroller.
Assemble and debug programs.

Course Outcome 2.

Write high level language programs for a microcontroller.

Learning Objectives 2.

Develop algorithms and write source code in C language for an embedded microcontroller.
Compile and debug programs.

Course Outcome 3.

Utilize high level software such as Microsoft Access.

Learning Objectives 3.

Develop a system based on Microsoft Access and VBA to collect, store and analyze typical process data.

	Course Outcome 4. Build interface circuitry **Learning Objectives 4.** Design, build and commission hardware interface circuitry for an embedded microcontroller. **Course Outcome 5.** Test completed modules and projects. **Learning Objectives 5.** Test the completed applications and debug the problems.
Date:	Tuesday, January 2, 2018
	Please refer to the course outline addendum on the Learning Management System for further information.