The University Senate of Michigan Technological University

Proposal 11-11

(Voting Units: Academic)

"Electrical Engineering Technology – Minor in Data Acquisition and Industrial Control"

Contact: Nasser Alaraje, alaraje@mtu.edu

1. Introduction

The Electrical Engineering Technology program in the School of Technology recommends the establishment of a minor in Data Acquisition and Industrial Control.

2. Rationale

Most real-world project assignments are multi-disciplinary in nature and involve electrical systems, computers, sensors, data acquisition software, and/or control systems. In a recent survey, engineering managers from 24 companies highly rated the ability of prospective employees to design and conduct experiments. Employers expect engineering graduates to have a working knowledge of data acquisition and the ability to interpret and analyze the data [1]. Students who choose a minor in Data Acquisition and Industrial Control will be given the opportunity to learn and experience the theory and hands-on practice of data acquisition and industrial control, thus increasing their job opportunities.

3. Details of Catalog Copy

a. Title of Minor

Data Acquisition and Industrial Control

b. Catalog Description

This School of Technology minor in data acquisition and industrial control provides students with hands-on educational experience that is well-respected and desired by industry. Students will gain solid knowledge in measurement principles, data acquisition, analysis and interpretation, and control systems analysis and design. This minor is most suitable for students in Electrical Engineering, Computer Engineering, Mechanical Engineering, Civil Engineering, Biomedical Engineering, Mechanical Engineering Technology, and Surveying Engineering.

c. List of Courses

This minor includes six (6) credits of required courses (Table 1), one course for three or four (3-4) credits from Table 2 and an additional six to seven (6-7) credits of electives in Table 3 for a total of 16 credits.

Table 1: Required Courses (6 credits)

Course	Title	Credits
EET 3131	Instrumentation (Spring)	3
EET 3373	Introduction to Programmable Controllers (Fall)	3

Table 2: Required Courses (3-4 credits - *select only one*)

Course	Title	Credits
EE 2110	Electric Circuits (Fall, Spring, Summer))	3
EE 3010	Circuits and Instrumentation (Fall, Spring, Summer)	3
EET 1411	Basic Electronics (Fall, Spring)	4
EET 2220	Electronic Devices & Circuits (Spring)	4

PH 2230	Electronics for Scientists (Spring)	4

Table 3: Elective Courses (6-7 credits)

Course	Title	Credits
EET 4141	Microcomputer Interfacing (Fall)	4
EET 4144	Real-Time Robotics Systems (On demand)	4
EET 4253	LabVIEW Programming for Data Acquisition (Spring)	3
EET 4311	Advanced Circuits & Controls (Fall)	4
EET 4373	Advanced Programmable Controllers (Spring)	4
ENVE 3502	Environmental Monitoring and Measurement Analysis (Spring)	3
GE 4250	Fundamentals of Remote Sensing (Spring)	3
MEEM 3000	Mechanical Engg Laboratory (Fall, Spring)	2
MEEM 4701	Analytical and Experimental Modal Analysis (Fall)	4
PH 4380	Computers in the Physics Lab (Fall)	2
SU 4003	GIS Technology Fundamentals (On demand)	1
SU 4010	Geospatial Concepts, Technologies, and Data (On demand)	3
UN 4000	Remote Sensing Seminar (Fall, Spring)	1

d. Prerequisites Not Listed in the Minor

The prerequisites for the required and elective courses for this minor are either already imbedded in the student's major or are flexible enough that few, if any, additional prerequisite courses will be necessary.

Required Courses (6 credits):
EET 3131 (EET 1411 or EET 2220 or PH 2230 or EE 2110 or EE 3010)
EET 3373 (EET 1411 or (EET 2120 and EET 2141) or EET 2411 or PH 2230 or EE 2110 or EE 3010)
Required Courses (3-4 credits - select only one course from the following)
EE 2110 (EE 2150 and (MA 3520 or MA 3521 or MA 3530 or MA 3560))
EET 1411 (MA 1031 or MA 1032 or MA 1161(C) or MA 1160(C) or MA 1135(C))
EET 2220 (EET 2120)
PH 2230 (PH 2200 or PH 2260)
Elective Courses (6-7 credits from the following)
EET 4141 (EET 2141 or CS 1121)
EET 4144 (EET 1411 or EET 2220 or PH 2230 or EE 2110 or EE 3010)
EET 4253 (EET 1411 or EET 2220 or EE 2110 or EE 3010 or PH 2230)
EET 4311 (EET 3131 or EET 4253)
EET 4373 (EET 3373)
ENVE 3502 (MA 2160 and CH 1100 or CH 1110 or CH 1112 or (CH 1150 and CH 1151))
GE 4250 (PH 2200 and MA 2160)
MEEM 3000 ((MEEM 2150(C) or ENG 2120) and MEEM 3230(C) and MEEM 3700(C) and EE 3010)
MEEM 4701 (MEEM 3000 and MEEM 3700)
PH 4380 (PH 2230)

4. New Course Descriptions

No new courses are required for this minor.

5. Estimated Costs

No additional costs will be associated with this minor since all the required and elective courses are existing courses and are presently being taught on a regular basis.

6. Planned Implementation Date

This minor will be offered as soon as the approval process is completed, ideally Fall 2011.

Reference:

[1] Lang, J. D., et al., "Industry Expectations of New Engineers: A Survey to Assist Curriculum Designers," *Journal of Engineering Education*, January 1999, pp. 43-51.

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