

# ROWAN UNIVERSITY CURRICULUM PROPOSAL

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**PROPOSAL TITLE:** Instrumentation

**ECK APPROPRIATE:**  UNDERGRADUATE     GRADUATE    3 SEMESTER HOURS

**SPONSOR(S):**  
Dr. John L. Schmalzel

**DEPARTMENT/TELEPHONE #** Electrical Engineering / 256-4629

**CHECK ONE:**  COURSE     MINOR PROGRAM     CONCENTRATION     SPECIALIZATION  
 ACHIEVEMENT CERTIFICATE     CERTIFICATION PROGRAM     MAJOR PROGRAM

<p><b>Step #1 (Department)</b></p> <p><u>24 Oct 97</u> Approved (Date) <input type="checkbox"/> Not Approved (Date)</p> <p><u>John Schmalzel / sec</u> Dept. Curriculum Chr.</p> <p><u>24 Oct 97</u> Reviewed (Date)</p> <p><u>John Schmalzel / sec</u> Dept. Chr.</p>	<p><b>Step #2 (Receipt)</b></p> <p>SCC# <u>97-98-180</u></p> <p><u>10-24-97</u> Date Received Senate</p> <p>_____ Senate Curriculum Chr.</p>	<p><b>Step #3 (School)</b></p> <p>Reviewed Date: <u>24 Oct 97</u></p> <p><input checked="" type="checkbox"/> Recommend to Approved <input type="checkbox"/> Recommend NOT to Approve</p> <p>Forward for Open Hearing: <input checked="" type="checkbox"/> WITHOUT Reservations <input type="checkbox"/> WITH Reservations:</p> <p>Comments:</p> <p><u>Robert P. Harketh</u> School Committee Chr.</p>
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**Step #4 (Academic Dean):**  Recommended     NOT Recommended     Conditionally Recommended (See Comments)

Comments:

Dean Signature/Date: [Signature] 10/28/97

**Step #5 (Senate Curriculum Committee):** Open Hearing Date: \_\_\_\_\_ Approved by Curriculum Committee Date \_\_\_\_\_

Returned to Sponsor(s) for the following reason:

**Step #6 (Senate)** Date announced/voted on at Senate 12/16 If voted on:  Approved     NOT Approved

Date forwarded to Executive Vice President/Provost 3/5/98

Senate Curriculum Committee chair Signature/Date: [Signature] 3/4/98

**Step #7 (Executive Vice President/Provost):** Date Received \_\_\_\_\_

\_\_\_ Approved

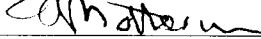
\_\_\_ NOT Approved If no, reasons are as follows:

Student Credit Hours \_\_\_\_\_

Faculty Load Hours \_\_\_\_\_

Equalized Credit Hours \_\_\_\_\_

Official Copy & Approval Sheet Filed (Date) 3/9/98

Executive Vice President/Provost Signature 

**Registrar**

Date Approved Course Description Received \_\_\_\_\_

Hegis Taxonomy and Course Number Assigned \_\_\_\_\_

Date/Signature of Registrar \_\_\_\_\_

**Notification Forward:**

\_\_\_\_\_ Senate Curriculum Committee Chairperson

\_\_\_\_\_ Department Chairpersons

\_\_\_\_\_ Academic Dean(s)

\_\_\_\_\_ Registrar

\_\_\_\_\_ Sponsor(s)

## Course Proposal

### 1. Details:

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|---|---|
| a) Course Title:                              | Instrumentation (0909.571)  |
| b) Sponsor:                                   | Dr. John L. Schmalzel, Electrical Engineering and Electrical Engineering Curriculum Committee   |
| c) Credit Hours:                              | 3 credit hours  |
| d) Course Level:                              | Graduate  |
| e) Curricular Effect:                         | Elective course for graduate students   |
| f) Prerequisites:                             | Hardware, software and experimental background.   |
| g) Suggested Time/<br>Scale of Implementation | Spring 1998<br>One section  |
| h) Resources                                  | No additional faculty are needed to meet this requirement. Laboratory equipment will be obtained consistent with College of Engineering multi-year budget. Library acquisitions will be required. |

### 2. Rationale:

The proposed course is a revision to part of the Engineering Curriculum Proposal approved by the College Senate in December, 1994. The proposed course is consistent with the establishment of the School of Engineering approved by the Board of Trustees in February, 1995.

Instrumentation is an underlying component of many engineering, scientific, and technical fields. Successful measurements require that the correct instrumental techniques be applied to a source and that signals are properly conditioned and processed to obtain data that contains information. Instrumentation deals with the sum of the elements involved in the measurement process.

### 3. Essence of the Course:

#### a) Objectives:

The proposed course has a number of objectives:

- (i) Provide an overview of instrumentation systems architecture.

- (ii) Provide a working knowledge of fundamental instrumentation terms and concepts; e.g., first- and second-order instruments, basic instrumentation elements.
- (iii) Survey transducers, signal conditioning circuitry, and digital signal processing operations.
- (iv) Treat elements of modern instrumentation systems; e.g., standards such as IEEE-488, and *Standard Commands for Programmable Instrumentation* (SCPI).
- (v) Apply the elements of instrumentation systems to the solution of a selected problem.

**b) Topical Outline:**

- Instrumentation architecture. Measurands, stimulus, response, environmental factors, signal conditioning, display, storage, communication, power supplies, etc.
- Instrumentation elements. Lumped-parameter modeling of instruments. Errors. Fundamental signal conditioning and signal processing actions. Off-the-shelf instrumentation electronics and subsystems.
- Transducers. Passive and active transducers. Transducers for force, pressure, temperature, humidity, power, etc. Smart sensor technologies.
- Instrumentation standards. Automatic test equipment (ATE) bus-oriented protocols (IEEE-488). Interface command languages (SCPI).
- Applications: Solution of a selected instrumentation problem.

**c) Evaluation and Grading Procedures:**

Student grades will be based on projects, examinations, homework, and written and oral technical communication.

**d) Course Evaluation:**

The proposed course will be evaluated based on student evaluations and critical review by engineering faculty.

**e) Texts:**

J.G. Webster, *Applied Biomedical Instrumentation*. McGraw-Hill, 1994.

**4. Results of Consultations: None**

**a) Consulted Departments:**

**b) Consultants and Consultant Statements:**

**c) Written Consultations:**

**5. Additional Supporting Information:**

## **6. Catalog Description:**

TITLE: Instrumentation

Elements of instrumentation systems are treated including transducers, signal conditioning, and signal processing. Elements of modern instrumentation systems including standards (IEEE-488, SCPI) and smart sensors are considered.

Prerequisite of hardware, software, and experimental background.