

1. *Course number and name*

**ENGR 410: Process Instrumentation and Control**

2. *Credits and contact hours*

3 credit hours; three 50-minute lecture sessions/week, or two 1-hr-15-minute lecture sessions/week, depending on semester

3. *Instructor's or course coordinator's name*

Instructor: V.V.Krishnan, Instructor

Course coordinator: V.V.Krishnan, Professor of Mechanical Engineering

4. *Text book, title, author, and year*

Smith, C.A., and Corripio, A.B., Principles and Practice of Automatic Process Control, Third Ed., John Wiley, 2006.

*other supplemental materials*

Marlin, T : "Process Control" , McGraw-Hill, Second Ed., 2000

Seborg, D.E., Edgar, T.F, and Mellichamp, D.A., "Process Dynamics and Control", John Wiley & Sons, Inc., Second Ed., 2004

Béla G. Lipták, editor, Instrument engineers' handbook : process control, Chilton Book Co., c1995.

Considine, D.M., "Process Instrumentation and Control Handbook", McGraw-Hill, 1985

Driskell, L., Control Valve Selection and Sizing, ISA, 1984

5. *Specific course information*

a. *brief description of the content of the course (catalog description)*

Principles of control and instrumentation. Control of level, flow, temperature, and pressure. Actuators and transducers. Process modeling

b. *prerequisites or co-requisites*

ENGR 300: Engineering Experimentation, ENGR 305: Linear Systems Analysis

c. *indicate whether a required, elective, or selected elective course in the program*

Required / Elective for Mechanical Engineering and Elective for Electrical Engineering

6. *Specific goals for the course*

a. *specific outcomes of instruction*

- To familiarize students with techniques of process modeling and linearization

- To introduce the principles of process control theory and some of its specific applications in actual industrial systems.
- To provide a working knowledge of basic techniques of process control and measurement and their applications in the design of process-control systems.
- To develop basic process control design skills including development of component specifications, control-valve sizing techniques, and preparation of Piping & Instrumentation diagrams.
- To familiarize students with standard process control configurations

*b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

Course addresses ABET Student Outcome(s): a, c, d, e, h, i, j, k.

*7. Brief list of topics to be covered*

- Process Controls: Terminology and Definitions
- Modeling of Simple Processes
- Control Valves
- Process Instrumentation
- Basics of Process Controls
- Design and tuning of simple Control loop
- Advanced Control Configurations
- Multivariable Control