Electronic Instrumentation

SYLLABUS

I. IDENTIFICATION

Program: Electrical Engineering		
Course: Electronic Instrumentation		
Class hours: 90 hours/class	**Academic year:** 2019/1	**Phase:** Optative class
Professor: Pedro Bertemes Filho		
Contact: pedro.bertemes@udesc.br		

II. SUMMARY

Basic fundamentals of signals; Introduction on sensors and transducers; Main concepts for signal conditioners; Principal integrated circuits for signal conversion; Standard systems for signal acquisition.

III. DIDACTIC PROGRAM

The class will cover but is not restricted to the following topics:

- Basics of measurement and physical quantities
- Instrument features
- Instrumentation for transducers
- Linearization processes
- Introduction and concepts for sensors an transducers
- Examples of thermal, mechanical and optical sensors
- Analogical signal processing: amplification, limitation and filtering
- Signal protection techniques
- The use of analog multiplexers
- Signal conversion principles: AD and DA converters
- Main conversion errors
- Basic of real-time measurement
- Examples of signal acquisition boards
- Practical features in signal conditioning
- Examples of industrial data acquisition systems

IV. LEARNING METHODOLOGY

The learning methodology will consist of lectures, seminars, activities at both electronic and computer laboratories and homeworks.

V. ASSESSMENT SYSTEM

The assessment will consist of one writing exam, one report based on a computer simulation, two reports based on laboratory experiments, and one seminar with group presentation throughout the semester.

IV. BIBLIOGRAPHY

JOHNSON, Curtis D. Process control instrumentation technology. 7th ed. New Jersey: Prentice Hall, c2003. 694 p. : ISBN 0130602485 (enc.)

LIPTÁK, Bela G INSTRUMENTATION, SYSTEMS, AND AUTOMATION SOCIETY. Instrument engineers' handbook. 4th ed. New York: CRC, c2003. 2 v. ISBN v. 1 0849310830 : v.2 08

PATON, Barry E. Sensors, transducers, & LabView: an application approach to learning virtual instrumentation. 1 ed. New Jersey: Prentice Hall PTR, 1998. 316 p. ISBN 0130811556

Steve Collins. INSTRUMENTATION AND COMPUTER CONTROL SYSTEMS SENSORS AND SIGNAL CONDITIONING. Michaelmas Term, 2012, 138p. Ebook.

Walt Boyes. Instrumentation Reference Book. 4th ed. Oxford: Elsevier, 2010, 929 p. ISBN: 978-0-7506-8308-1.

William C. Dunn. Fundamentals of Industrial Instrumentation and Process Control. McGraw-Hill eBook, 2005, 337 p. DOI: 10.1036/0071466932

John G. Wbster. Measurement, Instrumentation, and Sensors Handbook. CRC Press LLC, 1999, 2588 p.