

Sensors, transducers and data acquisition systems (ANUL III, SEMESTRUL VI)

Credit value (ECTS): 3

Course category: optional

Course holder

Prof. dr. Carmen BUJOREANU

Discipline objectives (course and practical training)

The aim of the course is to provide basic knowledge regarding the operating principles of sensors and transducers, in data acquisition, in order to emphasize the need to implement these principles to agricultural and food industry machinery and equipment

Contents (syllabus)

Course (chapter/subchapters)
Sensors and transducers: classification, description and operating principles
Principles of measuring/calibration. Metrological characteristics
Resistive stress transducers
Force and pressure sensors
Torque sensors
Other types of sensors used for agricultural and food industry equipment
Weighting moving vehicles
Basic principles for data acquisition (sampling, quantification, conditioning, signal conversion, coding)
Data acquisition boards (configurations, types, general layout, examples)
Convertors (A-D and D-a conversion, sampling and memory circuits, general layout, characteristics)
Signal conditioning (analogic analysers, time domain analysis, frequency domain analysis)
LabVIEW programming medium (structure, virtual instruments)

Practical training
Installation of resistive stress transducers; bridge connection
Measurements using force transducers
Measurements using torque transducers
Measurements using movement transducers
Elements of G language. Instructions for controlling program execution
Study of periodical signals. Numerical filters. Setting-up a complete program
Setting-up a data acquisition system for agricultural applications

References

1. Constantinescu I.N., Stefanescu D.M., Sandu M.A., Masurarea marimilor mecanice cu ajutorul tensometriei, Ed. Tehnica, Bucuresti, 1989
2. Stefanescu D.M., Handbook of Force Transducers. Principles and components, Springer, 2012
3. Barsanescu P., Carlescu P., Stoian A., Senzori pentru cantarirea autovehiculelor in miscare, Ed. Tehnopress, Iasi, 2009
4. Webster J. (ed.-in-chief), Measurement, Instrumentation, and Sensors Handbook, CRCnetBase, 1999
5. Carmen Bujoreanu, Achizitia si prelucrarea datelor experimentale, Ed. Tehnopress Iasi, 2006

6. C. Stefanescu, N. Cupcea, Sisteme inteligente de masura si control, Editura Albastra Cluj-Napoca, 2002
7. B.Drăgan, Achiziția și procesarea semnalului vibroacustic, Ed.Politehniun, 2004
8. F.Taraboanta, Echipamente pentru prelucrare si comunicarea datelor, Ed. Astel Design Iasi, 2000.
9. M. Gafitanu, S. Cretu, B. Dragan, Diagnosticarea vibroacustica a masinilor si utilajelor, Ed. Tehnica, 1989
10. V. Maier, C.D.Maier, LabVIEW in Calitatea Energiei Electrice, Editura Albastra Cluj-Napoca, 2000
11. F. Cottet, O. Ciobanu, Bazele Programarii in LabVIEW, Ed. Matrix Rom Bucuresti, 1998
12. ***LabVIEW- Data Acquisition/Course Manual/Users Guide, vol.I-IV, 2007 Edition.

Evaluation

Evaluation form	Evaluation methods	Percentage pf the final grade
Course-colloquium	written test	50%
Practical works	continuous evaluation+attendance	50%

Contact

prof. dr. Carmen BUJOREANU

Facultatea de Mecanică – Universitatea Tehnică “Gheorghe Asachi” din Iași

Str. Prof. Dr. Doc. Dimitrie Mangeron, Nr. 43, Iași, 700050, România

telefon: 0040 232 232337,

E-mail: carmen.bujoreanu@gmail.com

cbujorea@tuiasi.ro