UNIVERSITÀ DEGLI STUDI DI MILANO

E-SENSING TECHNOLOGIES AND CHEMOMETRICS

20th - 29th January 2021
25 hour course

Modulus I – E-sensing technologies

- Introduction to e-sensing technologies
- Basic principles, instrumentation and data acquisition

Modulus I – Practices on data acquisition

- Laboratory experience on the use of NIR, MIR and imaging instrumentations – *on virtual basis*

Modulus II – Basic principles of chemometrics

- Introduction to chemometrics
- Data pre-treatments
- Unsupervised and suervised modelling

*Modulus II – Practices on chemometrics**

- Practices on data pre-treatments and PCA
- Practices on qualitative and quantitative models
- Practices on image analysis

Modulus III – E-sensing technologies' applications

- The diversity of NIRS and MIRS applications in the agro-food sector
- Image Analysis for the agro-food sector

LECTURERS:

Prof. Cristina ALAMPRESE (cristina.alamprese@unimi.it)
Prof. Ernestina CASIRAGHI (ernestina.casiraghi@unimi.it)
Dr. Silvia GRASSI (silvia.grassi@unimi.it)

* The trial version of The Unscrambler software is necessary for practices on chemometrics (https://www.camo.com/download/). Students are invited to use their own experimental databases. Please contact the lecturers to discuss this possibility.

UNIVERSITÀ DEGLI STUDI DI MILANO

FOOD SYSTEMS PhD

E-SENSING TECHNOLOGIES AND CHEMOMETRICS

20th - 29th January 2021
25 hour course

Wednesday, January 20th, h. 14-18

Modulus I – E-sensing technologies

Introduction to e-sensing technologies (1.5 h; prof. Casiraghi).
Basic principles of Near and Mid Infrared Spectroscopy (NIRS-MIRS) (1.5 h; prof. Alamprese).
NIRS and MIRS instrumentation and sample presentation forms (1 h; prof. Alamprese).

Thursday, January 21st, h. 11-13

Modulus I – E-sensing technologies

Glossary and basic principles of image analysis (0.5 h; dr. Grassi).
Image acquisition and pre-processing (low-level processing) (1 h; dr. Grassi).
Image segmentation and object measurement (intermediate-level processing) (0.5 h; dr. Grassi).

Thursday, January 21st, h. 14-17

Modulus I – Practices on data acquisition

NIR and MIR spectra acquisition of liquid and solid samples (2 h; prof. Alamprese)
Image acquisition by scanner and photo-camera (1 h; dr. Grassi)

Friday, January 22nd, h. 9-13

Modulus II – Basic principles of chemometrics

Introduction to chemometrics (1 h; prof. Alamprese).
Mathematical pre-treatment of data (1.5 h; prof. Alamprese).
Unsupervised modelling – concepts & common approaches (1.5 h; prof. Alamprese).

Wednesday, January 27th, h. 14-18

Modulus II – Basic principles of chemometrics

Practices on data pre-treatments and PCA (2 h; prof. Alamprese).
Supervised modeling – concepts & common approaches (2 h; dr. Grassi).

Thursday, January 28th, h. 14-18

Modulus II – Basic principles of chemometrics

Supervised modeling – concepts & common approaches (2 h; dr. Grassi).

Modulus III – E-sensing technologies' applications

The diversity of NIRS and MIRS applications in the agro-food sector (2 h; prof. Casiraghi).

Friday, January 29th, h. 9-13

Modulus II – Basic principles of chemometrics

Practices on quantitative models (1.5 h; prof. Alamprese).

Modulus III – E-sensing technologies' applications

Examples of Image Analysis in the agro-food sector (1.5 h; prof. Casiraghi)
Practices with real images (1 h; dr. Grassi).