Automation and Informatics, 1st year, 1st semester, No. 13

Title: Pattern Recognition

Lecturer: Prof. Nikola Pavešić

Aim of the course:
To acquaint students with the methods of pattern recognition by classification and analysis.

Required (pre)knowledge:
Basic knowledge of applied mathematics (vectors and matrices, eigenvectors and eigenvalues, some linear algebra, multivariate analysis, probability, statistics).

Content:

- Introduction: definitions, pattern representations, pattern recognition by classification and analysis, applications of pattern recognition in robotics, medicine, forensics, man-machine communication, etc.

- Pattern preprocessing: basic concepts of restoration, enhancement, and normalization.

- Pattern segmentation: basic concepts of images and speech signals segmentation.

- Feature generation: pattern approximation, heuristic methods, optimal feature selection and extraction.

- Analysis of learning (training) sets: similarity measures, clustering, clustering tests, clustering techniques.

- Pattern classification: classification by matching, decision and artificial neural networks.

- Testing pattern recognition systems: performance measures, testing with testing set, testing with learning set.

Selected references:
S. Theodoridis, K. Koutroumbas: *Pattern Recognition*, Academic Press, Editions: 1999-2009.
J. T. Tou, R. C. Gonzalez: *Pattern Recognition Principles*, Addison-Wesley, 1974.