Name of the course: Design and Analysis of Algorithms	Total credits: 2+2+1=5

Type: Obligatory

IPM-18AUTDAAEG

Total hours per semester:
lecture: 26
practice: 26
consultation: 13

Type of testing: exam
Other: tests

Semester: 1st

Description

Stable matching. Gale-Shapley algorithm. Divide and conquer algorithms. Mergesort. Counting inversions. Closest pair of points. Dynamic programming. Sequence alignment. Knapsack, subset sum and change-making problems. Greedy algorithms. Scheduling problems. Clustering. Approximation algorithms. Load balancing problem. Center selection problem. Randomized algorithms. Quicksort. Quickselect. Karger's global minimum cut algorithm.

Literature

Compulsory

- J. Kleinberg, É. Tardos: *Algorithm Design*. Addison-Wesley, 2006.

Recommended

- T. H. Cormen, C. E. Leiserson, R. L. Rivest, C. Stein: Introduction to Algorithms. Second Edition. The MIT Press, 2001.

Competencies

Knowledge
- Possession of required knowledge in mathematics and process control, especially in the following areas: system and control theory, numerical methods, optimization methods.
- Detailed and expert-level knowledge of the technical terms and expressions of computer science in English.

Competencies
- Ability to formalize complex technical problems, to analyze theoretical and practical background, and to provide adequate solutions.
- Skills for cooperation and team work, and ability to take leading role.
- Ability for written and oral communication in English, using the technical terms and expressions of computer science. Ability to argue, to prepare reports, to read, understand and exploit scientific and technical material (e.g. books and papers).
- Expertise in utilizing sources of technical information, their critical interpretation and evaluation, and the extraction of information relevant to the solution of a specific problem.
- Ability to perform supervised scientific research, and skills required for post-graduate studies.

Attitude
- Attends professional, technological development related to their qualification.

- Commitment to critical feedback and self-assessment.
- Commitment to lifelong learning and receptivity to new IT competencies.
- Adopts and coordinates the ethical principles of work, organizational culture and research.
- Shares professional knowledge, mediates professional results.
- Commitment to quality standards and its IT tools.
- Open to initiate collaboration with IT and other specialists.

Autonomy and responsibility
- Takes responsibility for his professional decisions taken during his professional activities.
- Takes responsibility for observing and enforcing deadlines.
- Takes responsibility for own and fellow workers' work.