Course Code:	OG2EM	Level of Course:	Undergraduate	ECTS	5	Semester:	4
Course Title:	Electrical Machines			Year of Study:			2

Objective of the course:	Describe basic concepts of electromechanical conversion. Explain operating principles of DC and AC machines. Review construction and connections of rotating machines. Formulate the dynamic model of electrical machines (EM). Solve the air gap field and calculate the torque. Analyze the steady state operation and introduce equivalent circuits and mechanical characteristics. Provide students with the ability to analyze and specify AC and DC motors and generators. Review the power supply and control requirements of EM.
Course Contents:	Introducing basic concepts of electromechanical conversion. Rotating and linear machines. Conversion with nonlinear medium, field energy and coenergy relations, force and torque formula. Windings with quasi sinusoidal distribution. Components of the air gap field. Flux, magnetomotive and electromotive force. The airgap power and electromagnetic torque. Mechanical commutation in DC machines, electronic commutation in AC machines. Construction and operating principles of asynchronous, synchronous and DC machines. Naming conventions. Generalized dynamic model of DC machines. Typical connections, equivalent circuits and mechanical characteristics. Two phase equivalent of asynchronous machines, Clark and Park coordinate transformations. Voltage balance equations, dynamic torque and power formulas. Steady state equivalent circuits and parameters. Mechanical characterristics at constant frequency. Characteristics with variable frequency supply. Specifying an asynchronous motor. Dynamic model and equivalent circuits of synchronous machines. Characteristics with constant frequency supply. The torque, P and Q formula. Variable frequency supplied machines with permanent magnet excitation.
Teaching Methods:	45 hours of lectures + 30 hours of supervised problem classes and midterm tests. Approximately 75 hours of personal study and exercise (3 hours per week during the semester, and approximately 30 hours of preparation during exam term).
Literature:	7. Electrical machines, Fitzgerald-Kingsly 8. P. Krause: "Analysis of electical machines" 9. Samuel Seely: " Electromechanical Energy Conversion", McGraw-Hill
Assessment methods:	**Exam** - Three-hour examination. Two problems to be solved, related to machine analyses, modelling, application and performance calculation (25% each), plus 5 out of 6 multiple-choice questions to be answered (10% each). Minimum score of 55% required to pass the test. **Midterm Test** - replaces 50% of the exam.

Language of instruction:	Serbian	Date:		Signature:	