Course Unit Descriptor

Study Programme: Power, Electronic and Telecommunication Engineering (Power Engineering-Systems)		
Course Unit Title: Electric Machine Modeling		
Course Unit Code: EE520A		
Name of Lecturer(s): Veran Vasić		
Type and Level of Studies:Bachelor level		
Course Status (compulsory/elective): compulsory		
Semester (winter/summer): winter		
Language of instruction:english		
Mode of course unit delivery (face-to-face/distance learning): face-to-face		
Number of ECTS Allocated:6		
Prerequisites:none		
Course Aims: Acquisition of knowledge in the field of modelling of stationary and non-stationary condition and occurrences of synchronous, asynchronous and direct current machines		
Learning Outcomes: The ability to develop a mathematical model of the synchronous machine suitable for computer aided analysis- the ability to study the stationary condition and non-stationary occurrances of the synchronous machine- the ability to develop a mathematical model for the asynchronous machine suitable for the computer aided analysis- the ability to study the stationary condition and nonstationary occurrances of the asynchronous machine- the ability to develop a mathematical model for the direct current machine suitable for computer analysis- the ability to study the stationary condition and non-stationary occurrances of direct current machines.		
Syllabus Introduction. The basic mathematical model for the electrical machines. Parameters for electrical machines. Transformations of the original mathematical model for machines (C,F,H,G,D,B,E and T). Electrical machine types. Park's equations. Operation inductions (reaction) and the time constant of the synchronous machine. Stationary and quasi-stationary condition of the synchronous machine. Stationary condition of the asynchronous machine- the equivalent scheme. Simulation of the asynchronous machine supply. Models of asynchronous machines for method of field orientation control; electricity and voltage supply; rotor flux orientation; the analogy with the direct current machine. The model of the synchronous machine for field orientation control. Simulation of non-stationary processes in direct current machines. Non-stationary processes in synchronous machines. The synchronous machine model. A three-phase short circuit of the synchronous generator. The asynchronous operation of the synchronous machine. The non-stationary condition of the asynchronous machine. The physical explanation of the motor starting process. The analysis of the asynchronous machine starting in real environment. The direct current motor, theoretical approach. Equivalent schemes of direct current machines and the stationary operating condition. The non-stationary condition.		
Required Reading: Relevant literature in English		
Weekly Contact Hours:5	**Lectures:3**	**Practical work:2**

Teaching Methods:			
Knowledge Assessment (maximum of 100 points):100			
Pre-exam obligations	points	**Final exam**	points
Computer exercise attendance	5	Theoretical part of the exam	30
Lecture attendance	5		
Homework	10		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			