

Course title: RELIABILITY OF POWER SYSTEMS				
Course code	Course status	Semester	Number of ECTS credits	Lecture hours
PA6204	Optional	II	5	3L+1E

Study program:

Master studies, ELECTRICAL ENGINEERING, study program: Power systems and Control, department: Power systems (studies last for 10 semesters, 300 ECTS credits)

Prerequisites: No prerequisites required.

Course aims:

Students will be introduced with principles and characteristics of reliability and availability of power systems components, as well as with their influence on reliability of integral power system. Models and methods for calculation of reliability of generation systems, transmission systems, substations, distribution systems and integral power system will be presented.

Teacher(s) first and last names:

PhD Sreten Škuletić – professor, MSc Vladan Radulović – assistant

Studying method:

Lectures, exercises, computer simulations, consultations.

Course synopsis:

Preliminary week	Preparation and semester enrolment.
I week	Basics of probability. Introduction with reliability and availability.
II week	Reliability and availability of components, functions of density of failure probability, failure frequency.
III week	Reliability models and mathematical models for calculation of reliability. Un-renewable systems.
IV week	Renewable systems. Analytical and simulation techniques. Markov's models.
V week	Monte Carlo simulation. Approximate calculations of reliability.
VI week	<i>I colloquium</i>
VII week	Free week
VIII week	Basic and complex network structures. Generation capacities.
IX week	Transmission capacities. Substations.
X week	Complex (generation and transmission) systems. Distribution systems.
XI week	Distributed systems. Connected and integral power systems. Operational back up.
XII week	<i>II colloquium</i>
XIII week	Environment influence on system reliability and availability.
XIV week	Technical and economical calculations. Losses due to power supply interruptions.
XV week	Optimization of reliability.
XVI week	<i>Final exam – Seminar work</i>
Final week	Administrative procedures.
XVIII-XXI week	Additional lessons, correction of the final exam and administrative procedures.

STUDENT WORKLOAD

<u>per week</u>	<u>per semester</u>
<p>Working hours: 5 credits x 40/30 = 6 hours and 40 minutes.</p> <p>Working hours structure:</p> <ul style="list-style-type: none"> 3 hours for teaching 1 hour for exercises 2 hours and 40 minutes for individual work, including consultations. 	<p>Teaching and the final exam: (6hours and 40 minutes) x 16 = 106 hours and 40 minutes.</p> <p>Necessary preparation (before semester): 2 x (6hours and 40 minutes) = 13hours and 20 minutes.</p> <p>Total work hours for the course: 150hours</p> <p>Additional hours for preparing correction of the final exam, including the exam taking: up to 30hours.</p> <p>Work hours structure:</p> <p>106hours and 40 minutes (lectures) + 13hours and 20 minutes (preparation) + 30hours (additional work)</p>

Lessons attendance is mandatory for students, as well as doing homework and seminar works, etc.

Literature

1. Nahman J.: Metode analize pouzdanosti elektroenergetskih sistema, Naučna knjiga, Beograd, 1992
2. Bilinton R, Allan R.: Reliability Evaluation of Power Systems, Pitman Books Ltd, London, 1984.
3. Nahman J.: Dependability of Engineering Systems, Modeling and Evaluation, Springer, 2002.
4. Bilinton R, Allan R.: Reliability Evaluation of Engineering Systems, Plenum Press, New York, 1983.
5. IEEE, IEE proceedings

The forms of knowledge testing and grading:

- Two colloquiums carry 2x25 points,
- Final exam – Seminar work: 50 points.

Student gets the passing grade by collecting 55 points at least.

Special remarks for the course :

If needed, the course can also be taught in English.

Teacher(s) who provided the information: PhD Sreten Škuletić

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