

**Course title: Mathematics I**

Course code	Course status	Semester	Number of ECTS credits	Lecture hours
131001017	Mandatory	I	7.5	3+3

**Study program:**

Basic academic studies, ELECTRICAL ENGINEERING, study program: Power systems and Control (studies last for 6 semesters, 180 ECTS credits).

**Prerequisites:**

No prerequisites required.

**Course aims:**

To familiarize students with the basic mathematical concepts, propositions and methods, which are necessary for successful managing of other courses, as well as developing students creativity. Course covers elements of linear algebra, analytical geometry and differential calculus.

**Teacher(s) and assistant(s) first and last names:**

Ph.D. Milenko Mosurović – teacher  
two assistants

**Studying method:**

Lectures, exercises, individual work on preparation and exam tasks, consultations.

**Course synopsis:**

Preliminary weeks	Preparation and semester enrolment.
I week	Set, relation, function, operation. Algebraic structures. Group. Ring. Field.
II week	Vector algebra. Vectors - geometrical concept. Vector operations.
III week	Mathematical induction. Combinatorics. Variations. Combinations. Permutations. Binomial theorem.
IV week	Complex numbers (basic operations, power and root, De Moivre's formula). Matrix - basics. Linear operations with matrices.
V week	Matrices and determinants. Definition, properties and determinant expansion. Matrix inverse. Matrix exponentiation. Transpose, conjugate and transpose-conjugate matrix.
VI week	<b>First test</b>
VII week	<b>Free week</b>
VIII week	Linear equation systems. Gaussian algorithm. Cramer's rule. Matrix rank and Kronecker-Capelli theorem.
IX week	Line and plane in a space. Real numbers. Supremum and infimum. Properties of the set of real numbers.
X week	Limit of the sequence. Convergence tests. Number e. Limit of a function.
XI week	Continuity of a function. Properties of continuous functions. Uniform continuity of a function.
XII week	<b>Second test</b>
XIII week	Derivative and differential. Derivation rules. Tables of derivatives. Higher order derivative and differential.
XIV week	Basic theorems of differential calculus and L'Hospital's rule. Application of differential calculus. Taylor's formula.
XV week	Monotonicity, extremes and convexity of a function. Tangent and normal to a curve in a plane. Graph of a function.
XVI week	<b>Final exam</b>
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>
<b>Working hours:</b> 7.5 credits x 40/30 = 10 hours.	<b>Teaching and the final exam:</b> (10 hours) x 16 = 160 hours.
<b>Working hours structure:</b> 3 hours for teaching 3 hour for exercises 4 hours for individual work, including consultations.	<b>Necessary preparation</b> (before semester): 2 x (10 hours) = 20 hours. <b>Total work hours for the course:</b> 7.5 x 30 hours = 225 hours <b>Additional hours</b> for preparing correction of the final exam, including the exam taking: up to 45 hours. <b>Work hours structure:</b> 160 hours (lectures) + 20 hours (preparation) + 45 hours (additional work)

Lessons attendance is mandatory for students, as well as doing home exercises and both tests.

**Literature: Lectures:** Vučić Dašić, Linearna algebra i analitička geometrija. Univerzitet Crne Gore. Podgorica 2000.  
Vučić Dašić, Diferencijalni i integralni račun. Univerzitet Crne Gore. Podgorica 1998.  
**Exercises:** P. Miličić, M. Uščumlić, Zbirka zadataka iz više matematike I. Naučna knjiga, Beograd.  
S. Duborija, M. Mosurović, G. Šuković, Linearna algebra i analitička geometrija zbirka zadataka sa rješanim primjerima, PMF i GF. Podgorica 1997.  
S. Duborija, M. Mosurović, G. Šuković, S. Jančić, Diferencijalni i integralni račun – zbirka ispitnih zadataka, Univerzitet Crne Gore. Podgorica 1999.

**The forms of knowledge testing and grading:**

- Home exercises carry 2x2 points.
- Each test carries 23 points (46 points total).
- Final exam carries 50 points.

Student gets the passing grade by collecting 51 points at least.

**Special remarks for the course:**

**Teacher(s) who provided the information: Ph.D. Milenko Mosurović**

**Remark:**