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|  | **Course Syllabus** |

**1.** **Course Title:**

Mathematics

**2. Academic Level:**

Bachelor

**3. ECTS Credits:**

15=6+6+3 ECTS

**4. Semester:**

1, autumn semester; 2, spring semester; 3, autumn semester

**5. School/Department:**

Institute of Computer Technologies and Information Security

**6. Location:**

Taganrog Campus, 2 Chekhova St., Taganrog

**7. Instructor:**

Prof. Valeriy Mnukhin, PhD, [vbmnuhin@sfedu.ru](mailto:vbmnuhin@sfedu.ru)

**8. Language of Instruction:**

English

**9. Course Description:**

The course covers the basic topics of single-variable and multi-variable calculus, vector and linear algebra, analytic geometry, differential equations, complex analysis, probability theory and mathematical statistics.

**10. Course Aims:**

The aims the course are to encourage and enable students to:

• develop an understanding of the principles and nature of mathematics

• develop logical, critical and creative thinking

• develop confidence, perseverance, and independence in mathematical thinking and problem-solving

• appreciate the contribution of mathematics to other areas of knowledge

• develop the knowledge, skills and attitudes necessary to pursue further studies in mathematics

• develop the ability to reflect critically upon their own work and the work of others

**11. Specific entry requirements (if any):**

Basic knowledge of Mathematics

**12. Course Content:**

1. Analytic geometry and linear algebra

2. Differential and integral calculus of functions of one variable

3. Introduction to real analysis

4. Multivariable and vector calculus

5. Ordinary differential equations

6. Complex analysis

7. Fourier and Laplace transforms

8. Probability and statistics

**13. Intended Learning Outcomes:**

Upon a successful completion of this course, students are expected to have the following skills and abilities:

*Knowledge*: bases of real and complex analysis, linear algebra, differential equations, probability and statistics

*Skills*: to solve systems of linear equations, use vectors, limits, derivatives, integrals and series, to solve differential equations, to solve various problems related with probability and statistics

*Abilities:* use of the basic tools of mathematics for solving applied problems

**14. Learning and Teaching Methods:**

- Lectures with the use of presentation materials;

- Tutorials with a variety of examples of constructing mathematical models of problems and methods, solving practical problems in applied mathematics and computer science;

- Self-study and individual assignments;

- Use of reference books and Internet resources.

**15. Methods of Assessment/Final assessment information:**

During each of three semesters, the continuous assessment is based on two tests, 25 points each, interviews – 5 points, and on tutorial attendance – 5 points, so that total continuous assessment is 60 points per semester.

At the end of each semester, students have a summative final assessment (colloquium at the end of semester 1 and exams in semesters 2 and 3) based mostly on application of concepts taught during the semester. Students can get up to 40 points during the final assessment. A minimum of 60 points is required for an overall pass.

**16. Reading List:**

1) Bartle, R.G., Sherbert D.R. (2000). Introduction to Real Analysis. John Wiley & Sons, Inc. – 388 pp. ISBN: 0-471-32148-6.

2) Kreyszig, E. (2006). Advanced Engineering Mathematics. Wiley & Sons, Inc. – 1094 pp. ISBN: 0-471-72897-7.

3) Poole, D. (2006) Linear Algebra. A Modern Introduction. Thompson Brooks/Cole. – 712 pp. ISBN: 0-534-99845-3.

4) Brown, J.W., Churchill, R.V. (2009). Complex Variables with Applications. McGraw-Hill Higher Education. — 468 pp. ISBN: 0-07-305194-2.

5) Brannan, J.R., Boyse, W.E. (2007). Differential Equations. An Introduction with Modern Methods & Applications. John Wiley & Sons, Inc. – 682 pp. ISBN: 10 0-471-65141-9.

6) Spiegel, M.R., Schiller J.J., Srinivasan, R.A. (2013). Probability and Statistics. The McGraw-Hill Companies, Inc. -424 pp. ISBN: 978-0-07-179558-6

7) Mnukhin, V.B., Kupovykh G.V., Timoshenko, D.V. (2018). Linear Algebra. South Federal University. — 112 pp. ISBN: 978-5-9275-3088-5

8) Mnukhin, V.B., Kupovykh G.V., Timoshenko, D.V. (2018). Differential Calculus. South Federal University. — 115 pp. ISBN: 978-5-9275-3060-1