

Faculty: FACULTY OF TELECOMMUNICATIONS AND MANAGEMENT

Department: INFORMATION TECHNOLOGIES

Professional Field: 5.3 COMMUNICATION AND COMPUTER TECHNOLOGY

Specialty: CYBER SECURITY OF COMMUNICATION TECHNOLOGIES

Educational-qualification degree: BACHELOR

LEARNING COURSE DESCRIPTION

1. Course title: *ENGINEERING MATHEMATICS 1*

2. Course code: *B.43.001.1*

3. Type of the course: *compulsory*

4. Level: *Bachelor*

5. Year of study: *first*

6. Semester: *first*

7. Number of credits: *4.5*

8. Name of the lecturer: *Assoc. Prof. Dr. Krasimira Ivanov*

9. Course learning outcomes:

The aim of the course is to provide students with a systematic overview of theoretical and practical knowledge in order to provide the necessary mathematical apparatus in the study of the subjects included in the curriculum of the specialties.

Students who have completed their training in the discipline must acquire:

Basic knowledge of linear algebra, analytical geometry, mathematical analysis, differential equations and functions of complex variables.

Practical skills to apply basic mathematical methods for modeling and solving real problems and making basic calculations using the studied material.

Competencies: Upon successful completion of the course students should be able to:

- explain concepts, principles and apply mathematical methods related to the using of engineering mathematics;
- to choose the most appropriate methods for modeling a real task;
- to solve problems by applying certain mathematical methods;
- to make well-grounded conclusions about the problem.

10. Teaching methods:

Teaching methods: the training in *Engineering Mathematics 1* is carried out in the first semester according to the current curriculum through lectures grouped in two academic hours per week for 15 weeks and seminars, grouped in one academic hour per week for 15 weeks.

Project-based learning: During the lectures, the students get acquainted with the material. The training material is illustrated with examples and applications that make it easier for students to practice. The lectures are illustrated with graphic material, which is presented with multimedia projections and supplemented with examples and tasks that are solved on a whiteboard. Seminar exercises are held in a computer lab.

11. Prerequisites:

Students should have prior knowledge in the disciplines: mathematics from secondary education

Courses using the discipline are: Engineering Mathematics 2, Database Management Systems, Networks and Protocols 1 and 2, etc., included in the curriculum of the specialty.

12. Course contents:

The curriculum of the discipline presents the classical mathematical theory in various fields, accompanied by examples and scientific calculations in connection with the specifics of the specialty. In Section one of the curriculum are presented basic concepts in the field of linear algebra - determinants, algebra of matrices, solving systems of linear equations. Section two discusses the basic concepts and methods in analytic geometry. Section three introduces the basic concepts of mathematical analysis as derivatives of different classes of functions and their interpretation, integral calculus. Section four of the curriculum presents basic methods for solving classes of differential equations. Section Five introduces the set of complex numbers and functions of

complex variables. The presentation of the teaching material in Engineering Mathematics 1 is based on the use of the main methods of the proposed sections in the context of models for solving real problems.

13. Bibliography

Basic literature:

1. John Bird. Higher engineering mathematics. 8th ed. Routledge, CRC Press, Taylor & Francis Group, LLC. 2017. ISBN: 978-1-138-67357-1 (pbk), ISBN: 978-1-315-26502-5 (ebk). www.routledge.com/cw/bird
2. Dennis G. Zill. Advanced Engineering Mathematics. Loyola Marymount University. Sixth edition. Burlington, MA, USA: Jones & Bartlett Learning, 2017. ISBN: 978-1-284-10590-2
3. K.A. Stroud, Dexter Booth. Engineering Mathematics (8th Edition). Red Globe Press, 2020, <https://www.macmillanihe.com>
4. K.A. Stroud, Dexter Booth. Advanced Engineering Mathematics (6th Edition). Red Globe Press, 2020, <https://www.macmillanihe.com>
5. Abul Hasan Siddiqi, Mohamed Al-Lawati, Messaoud Boulbrachene. Modern Engineering Mathematics. CRC Press, Taylor & Francis Group, LLC, 2018 ISBN-13: 978-1-4987-1205-7

Additional literature:

1. Jean Linsky, James Nicholas, Brian Western. -Complete Pure Mathematics 1 for Cambridge International AS & A Level. Oxford University Press, 2018. ISBN: 978-0-19-842510-6
2. Jean Linsky, James Nicholas, Brian Western. Complete Pure Mathematics 2 & 3 for Cambridge International AS & A Level, Oxford University Press, 2018. ISBN: 978-0-19-842513-7
3. Karan Arora and Kush Garg. Scilab Textbook Companion for Higher Engineering Mathematics by B. S. Grewal. Civil Engineering Indian Institute of Technology Roorkee, Bombay, 2019 https://scilab.in/textbook_companion/generate_book/149
4. Patrick Keef, David Guichard. An Introduction to Higher Mathematics. Department of Mathematics, Whitman College, 2020. https://www.whitman.edu/mathematics/higher_math_online/
5. Видео лекции (англ.) <http://www.learnerstv.com/Free-Maths-Video-lectures-ltv348-Page1.htm>

14. Assessment methods and criteria:

The course ends with an exam.

The final grade in the course is formed on the basis of an exam at the end of the semester. Students have the right to be exempted from an exam on the basis of successfully solving tasks from Control works with a grade of not less than four on both controls.

15. Language of instruction: *Bulgarian*