General Information:

Name of Course: # ENGINEERING MATHEMATICS3

Course Code: MSB295ANVM
Semester: 1nd
Number of Credits: 5
Allotment of Hours per Week: 1 lectures, 2 practices
Evaluation: Mid-semester grade
Prerequisites: -

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Introduction, Learning Outcomes
The presentations give some elements of important mathematical techniques which is used in electrical engineering practice.
Upon completion of this course the student should be able to: **interpret,** and **put into practice**

- **a.** first- and second order ordinary differential equation,
- **b.** Laplace and inverse Laplace transform
- **c.** linear algebra,
- **d.** Fourier series

General Course Description and Main Content:
Brief Syllabus: This lecture and practical based course aims to give electrical engineering students a solid mathematics basis through covering the following topics:

- ODE
  classification, types of solution, analytical solution of first order, separable and linear differential equations, solution of incomplete and linear, second order ODE, Euler numerical method for first and second order differential equation, Laplace transform for linear ODE.
- Linear algebra
  Solution of linear equation system: Cramer's rule, Gauss-Jordan elimination, change of basis method. Eigenvector, eigenvalue
- Fourier series

Students learn the basics of mathematics enabling them to interpret and understand engineering sciences and through solving elementary tasks they deepen their basic theoretical knowledge in the field of engineering. The practical sessions are designed to complement the requirements of different specialisations.

Methodology:
The presentations give an introduction to important mathematical techniques of exercise solving and the basic theory of calculus. Equal emphasis is given to learning new mathematics and to learning how to construct and write down correct mathematical arguments. During the course student learn to apply computer algebra for numerical, symbolical solution and visualisation of the programs.

Engineering Mathematics 3 **Course Syllabus**

Course Code: MSB295AN Time: L Friday 7:45-8:30

Semester: Autumn 2019/2020 1. P Friday 8:30-10:00

Location: PTE MIK,L A-102, P A102

Schedule:

Study period in 15 weeks: September 2 - December 15 (2019)

1. No class
2. Introduction to ODE. First-order separable differential equations
3. First-order linear ODE, numerical solution: Euler method
4. Second order, incomplete ODE
5. Second-order, linear, homogenous and inhomogeneous differential equations with constant coefficients
6. Euler numerical method for second order ODE. Laplace transformation.
7. Inverse Laplace transform, solution of ODE using Laplace transformation. **Homework1**
8. Matrices and matrix operations. Determinant. Adjoint and inverse of a matrix **Mid-term test 1**
9. *No class Autumn holiday*
10. Solution of linear equation system: Cramer's rule, Gauss-Jordan elimination
11. Vectorspace, linear combination, linearly independent and dependent set.
12. Elementary change of basis, solving linear equation system using change of basis.
13. Eigenvalue, eigenvector. First-order, linear, homogenous differential equation systems.
14. Fourier series. **Homework2**
15. **Mid-term test 2**

Correction period: Dec 16-20 (2019) and Jan 6 (2020)

Attendance:

Attending is required all classes, and will impact the grade (max. 10%). Unexcused absences will adversely affect the grade, and in case of absence from more than 30% of the total number of lesson will be grounds for failing the class. To be in class at the beginning time and stay until the scheduled end of the lesson is required, tardiness of more than 20 minutes will be counted as an absence. In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note.

Evaluation + Grading

Grading will follow the course structure with the following weight:

1. Class participation, class activity 10 %
2. Homeworks 10 %.
3. Tests 80 %
4. Mid-term grade: over 55 % .

Grading scale

Numeric Grade:	5	4	3	2	1
Evaluation in points:	89%-100%	77%-88%	66%-76%	55%-65%	0-54%

Students with special needs:

Students with special physical needs and requiring special assistance must first register with the Dean of the Students Office. All reasonable requests to provide an equal learning environment for all students is to be assured.

Required Reading and other Materials will be equivalent to:

George B. Thomas, Jr.: Thomas' Calculus, Pearson Addision Wesley, 2005.
Howard Anton, Chris Rorres: Elementarí Linear Algebra, Wiley, 2014
https://www.khanacademy.org/math/integral-calculus
https://www.khanacademy.org/math/differential-equations
https://www.khanacademy.org/math/multivariable-calculus

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