Engineering Mathematics 3.   **Course Syllabus**
Subject Code: MSB295ANEP   Classes: Lecture,   Tuesday, 7:45-9:15, A206 (even weeks)
Semester: Autumn 2018/2019   Labs,   Wednesday,7:45-9:15, A109 (every week)

General Information

Name of Course:	ENGINEERING MATHEMATICS 3.
Course Code:	**MSB295ANEP**
Semester:	**3rd**
Number of Credits:	**3**
Allotment of Hours per Week:	**1** lecture, **2** practical / Week
Evaluation:	Mid-semester grade
Prerequisites:	**Engineering Mathematics 2.**
Instructors:	**Ákos PILGERMÁJER, master lecturer**
	Contact: **https://english.mik.pte.hu/organization-structure/search/pilgermajer**

Introduction, Learning Outcomes

The presentations give some elements of important mathematical techniques which is used in civil and mechanical engineering practice.

Upon completion of this course the student should be able to:

- **a.** **interpret,** and **put into practice** first- and second order ordinary differential equations (ODEs),
- **b.** **model** and **analyze** problems where random comes into consideration,
- **c.** **apply** quantities of descriptive statistics,
- **d.** **implement** and **interpret statistical** computations, elements of inferential statistics.

General Course Description and Main Content

This lecture and laboratory work based course aims to give engineering students a solid mathematics basis through covering the following topics:

- classification, types of solutions, analytical solution of first order, separable and linear differential equations, solution of incomplete and second order, linear ODEs with constant coefficients,
- random events, experiments, sample space, algebraic properties of operation on events, probability space, axioms of probability, counting finite sets, sum and product rule, computing probability with combinatorial, geometrical methods, conditional probability and independence, Bayes' theorem and the law of total probability, decision trees and their inverses,
- discrete and continuous random variables, transformations of random variablesexpectation and variance and their properties, well known discrete random variables: uniform, Bernulli, binomial, hypergeometric, Poisson, well known continuous random variables: uniform, exponential, normal, Markov's, Chebishev's inequality, law of large numbers (Chebyshev and Bernoulli forms), central limit theorem,
- joint and marginal random variables, their distributions, density functions, independence, covariance, correlation,
- point estimation of mean and variance, interval estimation: confidence interval for the mean in case of normal populations, statistical tests of samples, hypotesis and its alternative(s), errors, goodness of regression by means of chi-square test, linear regression and correlation.

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

Presentations give an introduction to important mathematical techniques of problem solving in the field of ODEs, probability theory and statistics. 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 solutions and visualisation of the problems in subject.

Attendance

Attending is required all classes, and will impact the grade (max. 10%). Unexcused absences will adversely affect the grade (the first and second with -3%, the third with -4%, the fourth with -5%), and in case of absence from more than 30% of the total number of lessons (five or more absences) implies that you fail the course with no further excuse. To be

Engineering Mathematics 3.   **Course Syllabus**
Subject Code: MSB295ANEP   Classes: Lecture,   Tuesday, 7:45-9:15, A206 (even weeks)
Semester: Autumn 2018/2019   Labs,   Wednesday,7:45-9:15, A109 (every week)

in class at the beginning and stay until the scheduled end of the lesson is required, tardiness of more than 15 minutes will be counted as an absence. In case of an acceptable situation the student must present a valid excuse, such as a doctor's note or other appropriate proof.

Evaluation + Grading
The final result will be calculated as the arithmetic average of midterm tests modified by the above described percentage of attendance. Grading is as:

Grading Scale:

Numeric Grade:	5	4	3	2	1
Evaluation:	89%-100%	77%-88%	66%-76%	51%-65%	0-50%

Description of the awarded grades
Mark 5: Outstanding work. Execution of work is thoroughly complete and demonstrates a superior level of achievement overall with a clear attention to details. The student is able to synthesize the course material with new concepts and ideas in a thoughtful manner, and is able to communicate and articulate those ideas in an exemplary fashion.

Mark 4: High quality work. Student work demonstrates a high level of craft, consistency, and thoroughness throughout its work. The student demonstrates a level of thoughtfulness in addressing concepts and ideas, and participates in group discussions. Work may demonstrate excellence but less consistently than above at grade '5'.

Mark 3: Satisfactory work. Student work addresses all of the assignment objectives with few minor or major problems.

Mark 2: Less than satisfactory work. Overall work is substandard, incomplete in significant ways, and lacks craft and attention to detail.

Mark 1: Unsatisfactory work. Work exhibits several major and minor problems with basic conceptual premise, lacking both intention and resolution. Overall the assignments are severely lacking, and is weak in clarity, craft and completeness.

Students with Special Needs
Students with a disability and needs to request special accommodations, please, notify the Deans Office. Proper documentation of disability will be required. All attempts to provide an equal learning environment for all will be made.

Readings and Reference Materials
1. Sheldon M. Ross, Introduction to probability and statistics for engineers and scientists, 2nd Edition, Elsevier Academic Press, 2004.
2. Documents in corresponding virtual space of Neptun Meet Street.

10.09.2018 Pécs   Pilgermájer Ákos