(Table 5.2) Course unit description

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|---|---|
| **Study program**: Mathematics | |
| **Type and level of studies:** Undergraduate academic studies | |
| **Course unit:** Differential Equation | |
| **Teacher in charge:** Bojana Borovicanin, Assistant Professor | |
| **Language of instruction:** *English* | |
| **ECTS:** 6 | |
| **Prerequisites:** None | |
| **Semester:** *Winter Semester* | |

**Course unit objective** This course covers some parts of the theory of ordinary differential equations (first order differential equations, higher order differential equations, systems of differential equations, problems of existence and uniqueness of solutions) and provides an insight into the possibility of applying differential equations in modelling different physical, technical or biological processes.

**Learning outcomes of Course unit**
 Students have the ability to apply the acquired knowledge and mathematical methods in solving various theoretical and practical problems.

**Course unit contents**
*Theoretical classes:*
**First order differential equations.** Introduction and definitions. Modelling via differential equations. Separable equations. Homogenous, linear, Bernoulli, Riccati equations. Exact and non-exact equations. Integrating factor technique. Existence and uniqueness of solutions.
**Higher order differential equations.** Introduction and basic results. Homogenous linear equations with constant coefficients. Non-homogenous linear equations. Method of undetermined coefficients. Method of variation of parameters.
**Systems of differential equations.** Normal systems of differential equations. Integral of a system of differential equations.
*Practical classes:* Application of theoretical knowledge to solve problems and tasks in these areas.

**Literature**
1.  W. E. Boyce, R. C. DiPrima, *Elementary Differential Equations and Boundary Value Problems*, Wiley, 2009.
2.  G. Teschl, *Ordinary Differential Equations and Dynamical Systems*, AMS, 2012.
3.  V. I. Arnol'd, *Ordinary Differential Equations*, Springer, 1992.

**Number of active teaching hours**

| Lectures: 3 | Practice: 3 | Other forms of classes: 0 | Independent work: 0 | Other classes: |
|---|---|---|---|---|

**Teaching methods**
Presentation and discussions, consultation with the professor, homework.

| Examination methods (maximum 100 points) | | | |
|---|---|---|---|
| **Exam prerequisites** | **No. of points** | **Final exam** | **No. of points** |
| Practical classes/tests | **40** | Written examination | |
| Student's activity during lectures | **4** | Oral examination | **50** |
| Homework | **6** | Other | |
| Seminars | | | |
| Project | | | |
| **Grading system** | | | |

| Grade | No. of points | Description |
| --- | --- | --- |
| 10 | >= 91 | Excellent |
| 9 | 81-90 | Exceptionally good |
| 8 | 71-80 | Very good |
| 7 | 61-70 | Good |
| 6 | 51-60 | Passing |
| 5 | <=50 | Failing |