### Course Profile

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<th>Course Number: MATH102</th>
<th>Course Title: Calculus II</th>
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<td>Required / Elective:</td>
<td>Required</td>
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<td>Prerequisites:</td>
<td>Math101</td>
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#### Catalog Description:
Integration techniques; improper integrals. Infinite series, positive and alternating series, power series, Taylor and Maclaurin series. Polar coordinates. Vectors and motion in space, vector valued functions.

#### Textbook / Required Material:

#### Course Structure / Schedule: (3+0+2) 4 / 7 ECTS

#### Extended Description:
Hyperbolic Functions. Basic Integration Formulas; Integration by Parts; Integration of Rational Functions by Partial Fractions; Trigonometric Integrals; Trigonometric Substitutions; Improper Integrals. Polar Coordinates; Graphing in Polar Coordinates; Areas and Length in Polar Coordinates; The Standard Polar Equations for Lines and Circles. Sequences. Infinite Series; Integral Test; Comparison Tests; Ratio and Root Tests; Alternating Series, Absolute and Conditional Convergence; Power Series; Taylor and Maclaurin Series; Convergence of Taylor Series; Error Estimates. Three-Dimensional Coordinate Systems; Vectors; The Dot Product; The Cross Product; Lines and Planes in Space; Vector Functions.

#### Design content: None

#### Computer usage: No particular computer usage required

### Course Outcomes:
By the end of the course, the students should be able to:

1. prepare for sophomore-level topics in mathematical analysis (differential equations and linear algebra), and calculus-based subjects in science and engineering [1, 2, 3, 7],
2. have knowledge of the fundamental definitions and theorems of elementary calculus [1,2,3,6,7],
3. complete routine derivations associated with calculus, recognize elementary applications of differential and integral calculus, and be literate in the language and notation of calculus [2, 3]
4. have the skills of appropriate level for modeling and solving complicated mathematical problems arising in various natural sciences as well as in electronic and computer sciences [3].

[1] Demonstrate the ability of solving problems by using techniques from calculus, linear algebra, differential equations, probability and statistics,
[2] Demonstrate knowledge of mathematics to construct, analyze and interpret mathematical models,
[3] Demonstrate the ability to apply mathematics to the solutions of problems,
[6] Have a basic knowledge of the main fields of mathematics, including analysis, algebra, differential equations, differential geometry,
[7] Have an ability to function both independently and as a member of a multidisciplinary team.
### Recommended reading:

### Teaching methods:
Lectures, tutorials, appropriate handouts which provide students with complex diagrams, graphs or formulas.

### Assessment methods:
Midterm exams, final exam

### Student workload:
- Pre-reading ...................................................8 hrs
- Lectures ..........................................................45 hrs
- Tutorials .........................................................30 hrs
- Preparatory reading .....................................25 hrs
- Problem solving............................................40 hrs
- Discussion......................................................20 hrs
- Midterm and final exams.................................7 hrs

**TOTAL ...................................................... 175 hrs ...... to match 25x7 ECTS**

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