

**Department of Mathematics**

**Course Profile**

<b>Course Number: MATH102</b>	<b>Course Title: Calculus II</b>
<b>Required / Elective:</b> Required	<b>Prerequisites:</b> Math101
<b>Catalog Description:</b> 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.	<b>Textbook / Required Material:</b> Thomas' Calculus Early Transcendentals 11 <sup>th</sup> Edition / Weir, Hass, Giordano, Addison - Wesley Publishing Company, 2006
<b>Course Structure / Schedule: (3+0+2) 4 / 7 ECTS</b>	
<b>Extended Description:</b> 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.	
<b>Design content:</b> None	<b>Computer usage:</b> No particular computer usage required
<p><b>Course Outcomes:</b> By the end of the course, the students should be able to:</p> <ol style="list-style-type: none"> <li>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],</li> <li>2. have knowledge of the fundamental definitions and theorems of elementary calculus [1,2,3,6,7],</li> <li>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]</li> <li>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].</li> </ol> <p>[1] Demonstrate the ability of solving problems by using techniques from calculus, linear algebra, differential equations, probability and statistics,</p> <p>[2] Demonstrate knowledge of mathematics to construct, analyze and interpret mathematical models,</p> <p>[3] Demonstrate the ability to apply mathematics to the solutions of problems,</p> <p>[6] Have a basic knowledge of the main fields of mathematics, including analysis, algebra, differential equations, differential geometry,</p> <p>[7] Have an ability to function both independently and as a member of a multidisciplinary team.</p>	

**Recommended reading:**

Calculus with analytic geometry / C.H. Edwards, Jr., David E. Penney. Englewood Cliffs, N.J., Prentice Hall, c1994. 4th ed.

Calculus with analytic geometry / Howard Anton ; in collaboration with Albert Herr. New York, Wiley, c1995. 5th ed.

Calculus with analytic geometry / Richard A. Silverman. Englewood Cliffs, N.J., Prentice-Hall, c1985.

**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
<b>TOTAL .....</b>	<b>175 hrs .....</b> to match 25x7 ECTS

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