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| **Identification** | **Subject** | MATH 105 Calculus 2 E, 6 ECTS | |
| | **Department** | Mathematics | |
| | **Program** | Undergraduate | |
| | **Term** | Spring, 2024 | |
| | **Instructor** | Rza Mustafayev | |
| | **E-mail:** | rzamustafayev@gmail.com | |
| | **Phone:** | (+994 50) 634 26 16 | |
| | **Classroom/hours** | wednesday 18:40-20:10, 20:20-21:00 | |
| **Prerequisites** | MATH 101- Calculus 1 | | |
| **Language** | English | | |
| **Compulsory/Elective** | Required | | |
| **Required textbooks and course materials** | ***Core Textbooks:***<br>1. George Thomas, et al, Thomas' Calculus: Early Transcendental, 12th edition, Addison-Wesley (2010), (http://libgen.org/)<br>**Supplementary book**<br>2. James Stewart , Essential calculus. Early transcendentals, Second Edition, Brooks/Cole (2013) (http://libgen.org/) | | |
| **Course outline** | In this subject we develop a method to calculate the areas and volumes of very general shapes. The integral is of fundamental importance in statistics, the sciences, and engineering. Here we will introduce three-dimensional coordinate systems and vectors, also. The course concerns the study of integration methods, definite integrals and their applications to evaluation areas, volumes, arc length, areas of surfaces of revolution, vectors, three-dimensional Coordinate Systems, limits and continuity in higher dimensions, partial derivatives. | | |
| **Course objectives** | The concepts of indefinite and definite integrals, vectors, three-dimensional coordinate systems, limits and continuity in higher dimensions, partial derivatives. Application of definite integrals to area, volume and arc length and areas of surfaces of revolution problems. | | |
| **Learning outcomes** | By the end of the course the students should be able:<br>• To find indefinite and definite integrals of functions<br>• To find area between different simple curves<br>• To apply the fundamental theorem of calculus<br>• Vectors<br>• Three-Dimensional Coordinate Systems<br>• Limits and Continuity in Higher Dimensions, Partial Derivatives | | |
| **Teaching methods** | **Lecture** | | x |
| | **Group discussion** | | x |
| | **Experiential exercise** | | x |
| | **Simulation** | | |
| | **Case analysis** | | |
| | **Course paper** | | x |
| | **Others** | | |
| **Evaluation** | **Methods** | **Date/deadlines** | **Percentage (%)** |
| | **Midterm Exam** | | 30 |
| | **Case studies** | | |
| | **Class Participation** | | 5 |

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| | **Quizzes** | | 20 (2 quizzes) |
| | **Project** | | |
| | **Activity** | | 5 |
| | **Laboratory work** | | |
| | **Final Exam** | | 40 |
| | **Others** | | |
| | **Total** | | 100 |

**Policy**

- **Preparation for class**

  The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes and work relevant problems and cases from the end of the chapter and sample exam questions. Throughout the semester we will also have a large number of review sessions. These review sessions will take place during the regularly scheduled class periods.

  - **Attendance**

    Students who do not attend more than 25% of classes will not be allowed to take the exam.

- **Withdrawal (pass/fail)**

  This course strictly follows grading policy of the School of Science and Engineering. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year.

- **Cheating/plagiarism**

  Cheating or other plagiarism during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0), without any considerations.

- **Professional behavior guidelines**

  The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited.

- **Participation**

  Every two non-participations of a student removes 1% out of his/her total percentage.

- **Ethics**

  Students should not arrive in late to class.

  All cell phones must be turned off and stowed away before entering class.

  Use of any electronic devices is not allowed in the classroom and violators will be punished accordingly.

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| Tentative Schedule | | | |
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| **Week** | **Date/Day (tentative)** | **Topics** | **Textbook/ Assignments** |
| 1 | 14.02.24<br>14.02.24 | • Volumes Using Cross-Sections<br>• Volumes Using Cylindrical Shells | **Ch. 6.1, 6.2 /** not assigned |
| 2 | 21.02.24<br>21.02.24 | • Arc Length<br>• Practice | **Ch. 6.3 /** not assigned |
| 3 | 28.02.24<br>28.02.24 | • Areas of Surfaces of Revolution<br>• Work and Fluid Forces | **Ch. 6.4, 6.5/** not assigned |
| 4 | 06.03.24<br>06.03.24 | • Moments and Centers of Mass<br>• The Logarithm Defined as an Integral | **Ch. 6.6, 7.1 /** not assigned |
| 5 | 13.03.24<br>13.03.24 | • Exponential Change and Separable Differential Equations<br>• Hyperbolic Functions | **Ch. 7.2, 7.3/** not assigned |
| 6 | 20.03.24<br>20.03.24 | **Novruz Holiday** | |
| 7 | 27.03.24<br>27.03.24 | • Relative Rates of Growth<br>• Integration by Parts | **Ch. 7.4,8.1/** not assigned **Quiz (10 pts)** |
| 8 | 03.04.24<br>03.04.24 | • Trigonometric Integrals<br>• Trigonometric Substitutions<br>• **Midterm Exam** | **Ch. 8.2, 8.3 /** not assigned |
| 9 | 10.04.24<br>10.04.24 | **Ramadan Holiday** | |
| 10 | 17.04.24<br>17.04.24 | • Integration of Rational Functions by Partial Fractions<br>• Vectors<br>• Three-Dimensional Coordinate Systems | **Ch.8.4, 12.1, 12.2, /** not assigned |
| 11 | 24.04.24<br>24.04.24 | • The Dot Product<br>• The Cross Product | **Ch.12.3, 12.4/** not assigned |
| 12 | 01.05.24<br>01.05.24 | • Functions of Several Variables | **Ch. 14.1/** not assigned |
| 13 | 08.05.24<br>08.05.24 | • Limits and Continuity in Higher Dimensions<br>• Partial Derivatives | **Ch. 14.2, 14.3/** not assigned |
| 14 | 15.05.24<br>15.05.24 | • The Chain Rule<br>• Directional Derivatives and Gradient Vectors | **Ch. 14.4,14.5/** not assigned |

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| | | | **Quiz (10 pts)** |
| 15 | 22.05.24<br>22.05.24 | • Tangent Planes and Differentials<br>• Extreme Values and Saddle Points | **Ch. 14.6,14.7 /**not assigned |
| 16 | 29.05.24<br>29.05.24 | • Taylor's Formula for Two Variables | **Ch. 14.9 /**not assigned |
| | **TBA** | **Final Exam** | |

This syllabus is a guide for the course and any modifications to it will be announced in advance.