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| **Identification** | | | **Subject** | Applied Differential Equations | | | |
| **Department** | Mathematics | | | |
| **Program** | Undergraduate | | | |
| **Term** | Fall, 2017 | | | |
| **Instructor** | Hüseynli Ali Abbas (PhD) | | | |
| **E-mail:** | [ahuseynli@khazar.org](mailto:ahuseynli@khazar.org), [alihuseynli@gmail.com](mailto:alihuseynli@gmail.com) | | | |
| **Phone:** | (+994)050-667-46-86 | | | |
| **Classroom/hours** | Monday 15.20, Tuesday 13.40 | | | |
| **Prerequisites** | | | *Applied Differential Equations* isa second-year, first-semester course. The prerequisites are Calculus 1 and Calculus 2 courses. | | | | |
| **Language** | | | English | | | | |
| **Compulsory/Elective** | | | Required | | | | |
| **Required textbooks and course materials** | | | ***Core Textbooks:***   1. William E.Boyce and Richard C. DiPrima, Elementary Differential Equations and Boundary Value problems, 10th edition, 2012 | | | | |
| **Course website** | | |  | | | | |
| **Course outline** | | | Applied Differential Equations is a foundational course at School of Engineering and Applied Sciences of Khazar University; it plays an important role in the understanding of science, engineering, economics, and computer science, among other disciplines. This introductory course covers a number of integration methods of differential equations and introduce preliminary techniques of using of Laplace transform. | | | | |
| **Course objectives** | | | Some methods of integration of n-th order ordinary differential equations with constant and non-constant coefficients; Laplace transform method. | | | | |
| **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** | |  | 10 | |
| **Quizzes** | |  | 20(4 quizzes) | |
| **Project** | |  |  | |
| **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.   * **Quizzes and examinations**   Quizzes may be given unannounced throughout the term. There will be  no make-up quizzes.  No make-up exams. If students miss an exam, a zero score will be  assigned to the missed exam.   * **Withdrawal (pass/fail)**   This course strictly follows grading policy of the School of Engineering and Applied Science. 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.   * **Ethic**   Use of any electronic devices is prohibited in the classroom. All devices should be turned off before entering class. This is a university policy and violators will be reprimanded accordingly!  Students should not arrive in late to class! | | | | |
| **Tentative Schedule** | | | | | | | |
| **Week** | **Date/Day**  **(tentative)** | **Topics** | | | | | **Textbook/ Assignments** |
| 1 | 18. 09. 17  19. 09. 17 | First order linear differential equations, existence and uniqueness of solution | | | | | **1.1, 1.2, 1.3** |
| 2 | 25. 09. 17  26. 09. 17 | Nonlinear equations, constructing integral curves | | | | | **2.1** |
| 3 | 02. 10. 17  03. 10. 17 | Separable equations | | | | | **2.2** |
| 4 | 09. 10. 17  10. 10. 17 | Exact equation, integrating factors | | | | | **2.6** |
| 5 | 16. 10. 17  17. 10. 17 | Homogeneous equations | | | | | **2.1** |
| 6 | 23. 10. 17  24. 10. 17 | Novruz holiday | | | | |  |
| 7 | 30. 10. 17  31. 10. 17 | Second order linear differential equations; fundamental solutions of the homogeneous equations Linear independence | | | | | **3.1, 3.2** |
| 8 | 06. 11. 17  07. 11. 17 | Reduction of the order | | | | | **3.1, 3.2** |
|  |  | **Midterm Exam** | | | | |  |
| 9 | 20. 11. 17  21. 11. 17 | Homogeneous equation with constant coefficients | | | | | **3.3, 3.4** |
| 10 | 27. 11. 17  28. 11. 17 | The non-homogenous problem, the method of undetermined coefficients | | | | | **3.5** |
| 11 | 04. 12. 17  05. 12. 17 | The method of variation of parameters | | | | | **3.6** |
| 12 | 11. 12. 17  12. 12. 17 | General theory of nth order linear differential equations | | | | | **4.1** |
| 13 | 18. 12. 17  19. 12. 17 | The n-th order linear equations, homogeneous equations with constant coefficients | | | | | **4.2** |
| 14 | 25. 12. 17  26. 12. 17 | The method of undetermined coefficients | | | | | **4.3** |
| 15 | 01. 01. 18  02. 01. 18 | The method of variation of parameters Laplace transformation. Solution of linear system by elimination | | | | | **4.4** |
|  |  | **Final Exam** | | | | |  |

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