|  |  |
| --- | --- |
| antalya bilim Ã¼niversitesi ile ilgili gÃ¶rsel sonucu | **ECTS Course Description Form** |
| **PART I ( Senate Approval)** |
| **Offering School**  | College of Engineering |
| **Offering Department** | Industrial Engineering |
| **Program(s) Offered to** | Industrial Engineering | Civil Engineering |
| Computer Engineering |  |
| Electrical and Electronics Engineering |  |
| **Course Code**  | Math 202 |
| **Course Name** | Differential Equations |
| **Language of Instruction** | English |
| **Type of Course** | *Compulsory* |
| **Level of Course** | Senior |
| **Hours per Week** | Lecture: 4 hours  | Laboratory:1 | Recitation:  | Practical:  | Studio: | Other: |
| **ECTS Credit** | 5 |
| **Grading Mode** | Catalog |
| **Pre-requisites** | Math 102 |
| **Co-requisites** | None |
| **Registration Restriction** | None |
| **Educational Objective** | * Improving mathematical thinking
* Able to solve problems in Mathematics, Physics and Engineering
 |
| **Course Description** | *Considering about first order differential equations/ Solutions and applications of first order several differential equations/ Basic theorems for high order differential equations with variable and constant coefficients/ Noncertain coefficient and operator method for linear equations with constant coefficients/ Variation of Parameters Method/ Decreasing Order Method/ Convertion of Variable Method/ Euler-Cauchy Differential Equation/ Exact high order differential equations/ Solutions of initial value problems with Laplace Method/ Linear Differential Equations* |
| **Learning Outcomes**  | **LO1** | Students will learn improving mathematical thinking. |
| **LO2** |  Students will learn serving ability to solve differential equations. |
| **LO3** |  Students will learn solving problems they see in Mathematics, Physics and Engineering. |
| **LO4** |  Students will learn cause to gain method in scientific research |
| **LO5** |  |
| **LO6** |
| **n..** |
| **PART II ( Faculty Board Approval)** |
| **Basic Outcomes (University-wide)** | **No.** | **Program Outcomes** | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** | **LO6** |
| **PO1** | **Ability** to communicate effectively and write and present a report in Turkish and English.  |  |  |  | **🗸** |  |  |
|  |  |  |  |  |  |  |  |
| **PO2** | **Ability** to work individually, and in intra-disciplinary and multi-disciplinary teams. | **🗸** |  | **🗸** |  |  |  |
| **PO3** | **Recognition** of the need for life-long learning and **ability** to access information , follow developments in science and technology, and continually reinvent oneself. | **🗸** | **🗸** | **🗸** | **🗸** |  |  |
| **PO4** | **Knowledge** of project management, risk management, innovation and change management, entrepreneurship, and sustainable development. |  |  | **🗸** | **🗸** |  |  |
| **PO5** | **Awareness** of sectors and **ability** to prepare a business plan. |  |  | **🗸** |  |  |  |
| **PO6** | **Understanding** of professional and ethical responsibility and **demonstrating** ethical behavior. |  | **🗸** | **🗸** | **🗸** |  |
| **Faculty Specific Outcomes** | **PO7** |  |  |  |  |  |  |  |
| **PO8** |  |
| **PO9** |  |
| **PO10** |  |
| **PO11** |  |
| **PO12** |  |
| **Discipline Specific Outcomes (program)** | **PO13** |  |
| **PO14** |  |
| **PO15** |  |
| **PO16** |  |
| **PO17** |  |
| **PO18** |  |
| **Specialization Specific Outcomes** | **PO N….** |  |
| **PART III ( Department Board Approval)** |
| **Course Subjects, Contribution of Course Subjects to Learning Outcomes, and Methods for Assessing Learning of Course Subjects** | **Subjects** | **Week** |  | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** | **LO6** |
| **S1** | 1 | Classification and Definition of Differential Equations, Order of Differential Equation, Solutions of Differential Equations, Curve of Integral, Closed and Opened Solution, Specific Solution, General Solution, Singular Solution, Initial Value Problem, Obtaining Differential Equations | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S2** | 2 | First Order Differential Equations: Differential Equations with Seperated Variables, Homogeneous Functions, Population Dynamics and Modeling | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S3** | 3 | Exact Differential Equations, Integration Multiplier with One Variable, Numerical Solution: Euler Method, Existence and Singularity Theorem | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S4** | 4 | Second Order Differential Equations: Homogenous Equations with Constant Coefficents, Characteristic Equations, General Solutions of Linerar Homogenous Equations, Linear Independency and Wronskian Theorem | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S5** | 5 | Compex Roots of Charectistic Equations, Real Roots, Repeated Roots, Decreasing Order, Non homogenous Equations | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S6** | 6 | First Midterm, Uncertain Coeffecints Method(Changing Constant – Langrange Method) | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S7** | 7,8 | High Order Linear Differential Equations: General Theory of Nth Order Linear Differential Equations, Homogeneous Equations(Two Sided Equations), Specific Solutions, Linear Independency and Wronksinan Determinant, Homogenous Equations with Constant Coefficient, Characteristic Polynema, Characteristic Equations, Real and Different Roots, Complex Roots, Repeated Roots | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S8** | 9 | Uncertain Coefficient Method, Variation of Parameters Method, Second Order Differential Equations: Differential Equations without Dependent Variable, Differential Equations without Independent Variable, Euler Differential Equation with Euler Equation | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S9** | 10,11 | Laplace Transformation, Definition of Laplace Transformation, Inverse Laplace Transformation, Definition of Laplace Transformation, Second Midterm | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S10** | 12,13 | Solving Initial Value Problems with Laplace Transformation, Step Function, Impulse Function, Integrated Integral Equations | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **S11** | 14 | First Order Linear Differential Equation Systems: Omiting and Determinant Method | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 |  |  |
| **Assessment Methods, Weight in Course Grade, Implementation and Make-Up Rules**  | **No.** | **Type** | **Weight** | **Implementation Rule** | **Make-Up Rule** |
| **A1** | **Exam** | *80%* | *2 Midterms 1 Final* |  |
| **A2** | **Quiz** |  |  |  |
| **A3** | **Homework** | *20%* | *Once Every Week* |  |
| **A4** | **Project** |  |  |  |
| **A5** | **Report** |  | - | - |
| **A6** | **Presentation** |  | - | - |
| **A7** | **Attendance/ Interaction** |  | - | - |
| **A8** | **Class/Lab./****Field Work** |  | - | - |
| **A9** | **Other** |  |  |  |
| **TOTAL** | **100%** |
| **Evidence of Achievement of Learning Outcomes** |  |
| **Method for Determining Letter Grade** |  |
| **Teaching Methods, Student Work Load** | **No** | **Method** | **Explanation** | **Hours** |
| ***Time applied by instructor*** |
| **1** | **Lecture** |  | 3 hours 40 minutes in a week |
| **2** | **Interactive Lecture** |  |  |
| **3** | **Recitation** |  |  |
| **4** | **Laboratory** |  |  |
| **5** | **Practical** |  |  |
| **6** | **Field Work** |  |  |
| ***Time expected to be allocated by student*** |
| **7** | **Project** |  |  |
| **8** | **Homework** |  | 3 hours in a week |
| **9** | **Pre-class Learning of Course Material**  |  | 1 hour in a week |
| **10** | **Review of Course Material** |  | 2 hours in a week |
| **11** | **Studio** |  |  |
| **12** | **Office Hour** |  |  |
| **TOTAL** |  |
| **IV. PART** |
| **Instructor** | **Name** | Sevgi Şengül |
| **E-mail** | sevgi.sengul@antalya.edu.tr |
| **Phone Number** | *+90544402893* |
| **Office Number** | *A1-38* |
| **Office Hours** |  |
| **Course Materials** | **Mandatory** | Elementary Differential Equations and Boundary Value Problems by William E. Boyce and Richard C. DiPrima, International Student Version 10th Edition, Wiley  |
| **Recommended** |  |
| **Other** | **Scholastic Honesty** |  |
| **Students with Disabilities** |  |
| **Safety Issues**  |  |
| **Flexibility** |  |