# CALCULUS III (DIFFERENTIAL EQUATIONS)

| 1 | Course Title: | CALCULUS III (DIFFERENTIAL EQUATIONS) | |
|---|---|---|---|
| 2 | Course Code: | MAT2083 | |
| 3 | Type of Course: | Compulsory | |
| 4 | Level of Course: | First Cycle | |
| 5 | Year of Study: | 2 | |
| 6 | Semester: | 4 | |
| 7 | ECTS Credits Allocated: | 6.00 | |
| 8 | Theoretical (hour/week): | 3.00 | |
| 9 | Practice (hour/week): | 2.00 | |
| 10 | Laboratory (hour/week): | 0 | |
| 11 | Prerequisites: | - | |
| 12 | Language: | Turkish | |
| 13 | Mode of Delivery: | Face to face | |
| 14 | Course Coordinator: | Dr. Ögr. Üyesi SETENAY DOĞAN | |
| 15 | Course Lecturers: | Prof.Dr.Mehmet Çağlıyan, Yrd.Doç.Dr.Nisa Çelik, Yrd.Doç.Dr.Emrullah Yalçın, Yrd.Doç.Dr.Sezai Hızlıyel | |
| 16 | Contact information of the Course Coordinator: | setenay@uludag.edu.tr 0224 2941763 U.Ü. Fen Edebiyat Fakültesi Matematik Bölümü Nilüfer BURSA | |
| 17 | Website: | | |
| 18 | Objective of the Course: | Mathematics, physics and engineering problems to teach the types of analytic solutions of differential equations is used to obtain | |
| 19 | Contribution of the Course to Professional Development: | | |
| 20 | Learning Outcomes: | | |
| | | 1 | Knows to solve differential equations |
| | | 2 | Learn basic mathematical formulas, and use the best |
| | | 3 | Learns the analytical solution |
| | | 4 | Knows to apply differential equations to mathematics and physics |
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| 21 | Course Content: | | |

## Course Content:

| Week | Theoretical | Practice |
|---|---|---|
| 1 | Definition and properties of differential equations. Types of first order equations and solutions | |
| 2 | The initial and boundary value problems, existence and uniqueness theorem for differential equations | |
| 3 | First order differential equations | |

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| **4** | Separable, linear Bernoulli, Riccati equations | | | |
| **5** | May become homogeneous equations, the variable substitution method and its applications | | | |
| **6** | Nonlineer differential equations | | | |
| **7** | The first Midterm exam and general review | | | |
| **8** | n th order differential equations. Fixed or variable-coefficienthomogeneous equations and solution methods. | | | |
| **9** | Non-homogeneous solution of the equation. method of undetermined coefficiens. | | | |
| **10** | The second midterm and general review | | | |
| **11** | Variation of parameters and the Cauchy-Euler differential equation | | | |
| **12** | System of differential equations and their solutions | | | |
| **13** | Laplace transform and the Laplace transform solution of differential equations. | | | |
| **14** | Physics and engineering applications of differential equations | | | |

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| **22** | Textbooks, References and/or Other Materials: | Adi Diferensiyel Denklemler<br>Mehmet Çağlıyan<br>Nisa Çelik<br>Setenay Doğan |

| Activites | Number | Duration (hour) | Total Work Load (hour) |
|---|---|---|---|
| Theoretical Midterm Exam | 2 | 50.00 14 | 3.00 | 42.00 |
| Practicals/Labs | 14 | 2.00 | 28.00 |
| Self study and preparation Homework-project | 0 | 0.00 14 | 5.00 | 70.00 |
| Homeworks | 0 | 0.00 | 0.00 |
| Projects Total | 3 | 100.00 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Success Grade Midterm exams | 2 | 10.00 | 20.00 |
| Others | 0 | 0.00 | 0.00 |
| Total Exams | 100.00 | 20.00 | 20.00 |
| Total Work Load | | | 180.00 |
| Course Total work load/ 30 hr | | | 6.00 |
| ECTS Credit of the Course | | | 6.00 |

| 25 | | CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS | | | | | | | | | | | | | | |
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| | PQ1 | PQ2 | PQ3 | PQ4 | PQ5 | PQ6 | PQ7 | PQ8 | PQ9 | PQ10 | PQ11 | PQ12 | PQ13 | PQ14 | PQ15 | PQ16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ÖK1** | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK2** | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK3** | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**LO: Learning Objectives    PQ: Program Qualifications**

| Contribution Level: | 1 very low | 2 low | 3  Medium | 4 High | 5 Very High |
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| Contribution Level: | 1 very low | 2 low | 3  Medium | 4 High | 5 Very High |
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