# REEL ANALYSIS I

| | | |
|---|---|---|
| 1 | Course Title: | REEL ANALYSIS I |
| 2 | Course Code: | MAT5101 |
| 3 | Type of Course: | Compulsory |
| 4 | Level of Course: | Second Cycle |
| 5 | Year of Study: | 1 |
| 6 | Semester: | 1 |
| 7 | ECTS Credits Allocated: | 6.00 |
| 8 | Theoretical (hour/week): | 3.00 |
| 9 | Practice (hour/week): | 0.00 |
| 10 | Laboratory (hour/week): | 0 |
| 11 | Prerequisites: | none |
| 12 | Language: | Turkish |
| 13 | Mode of Delivery: | Face to face |
| 14 | Course Coordinator: | Prof. Dr. OSMAN BİZİM |
| 15 | Course Lecturers: | Prof. Dr. Osman Bizim |
| 16 | Contact information of the Course Coordinator: | Uludağ Üniversitesi, Fen-Edebiyat Fakültesi<br>Matematik Bölümü, Görükle Bursa-TÜRKİYE 0 224 294 17 57 / obizim@uludag.edu.tr |
| 17 | Website: | |
| 18 | Objective of the Course: | The aim of this course is to review student's undergradute analysis courses and to correct the deficiencies. So students can be su have succsessful in graduate studies. |
| 19 | Contribution of the Course to Professional Development: | |
| 20 | Learning Outcomes: | |

| | | |
|---|---|---|
| | 1 | Learns the real number system, Euclidean Spaces, metric spaces, basic topological properties of R. |
| | 2 | Learns compact and connected sets and their properties, sequences and series. |
| | 3 | Learns power series, absolute convergence. |
| | 4 | Learns countinuity and continous functions and their properties |
| | 5 | Learns differentiation and properties of the differentiable functions. |
| | 6 | Learns The Riemann-Stieltjes integral and its properties. |
| | 7 | Learns sequences and series of functions and their properties, uniform convergence, |
| | 8 | |
| | 9 | |
| | 10 | |

| | |
|---|---|
| 21 | Course Content: |

**Course Content:**

| Week | Theoretical | Practice |
|---|---|---|
| 1 | The real and complex number system, Euclidean Spaces, metric spaces and their properties | |

| | | |
|---|---|---|
| **2** | Basic topological properties of R, compact and connected sets and their properties | |
| **3** | Sequences and series in R and C, and their properties | |
| **4** | Power series and absolute convergence, addition and multiplicatio of series | |
| **5** | Countinuity and continous functions and their properties | |
| **6** | Differentiation and properties of the differentiable functions | |
| **7** | Mean value theorem and its applications | |
| **8** | Vector-valued functions and their properties | |
| **9** | The Riemann-Stieltjes integral and its properties | |
| **10** | Integration of vector-valued functions | |
| **11** | Sequences and series of functions and their properties, uniform convergence, The Stone-Weierstrass theorem, some special functions. | |
| **12** | Uniform convergence of sequences and series of functions | |
| **13** | The Stone-Weierstrass theorem and its applications | |
| **14** | Some special functions, the exponential and the logarithmic functions, the trigonometric functions, Fourier series, the Gamma function and their properties | |

| Activites | Number | Duration (hour) | Total Work Load (hour) |
|---|---|---|---|
| Theoretical | 14 | 3.00 | 42.00 |
| Practicals/Labs | 0 | 0.00 | 0.00 |
| Self study and preperation | 14 | 10.00 | 140.00 |
| Homeworks | 0 | 0.00 | 0.00 |
| Projects | 0 | 0.00 | 0.00 |
| Midterm Exam | 0 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Midterm exams | 0 | 0.00 | 0.00 |
| Home work-project | 0 | 0.00 | 0.00 |
| Others | 14 | 5.00 | 70.00 |
| Final Exams | 1 | 18.00 | 18.00 |
| Total | 1 | 100.00 | |
| Total Work Load | | | 270.00 |
| Total work load / 30 hr | | | 9.00 |
| ECTS Credit of the Course | | | 6.00 |

[3] Real Analysis, H. L. Royden,
[4] Introduction to Real Analysis, W. F. Trench.

| | | |
|---|---|---|
| **23** | Assessment | |
| | Midterm exams | |
| | Home work-project | |
| | Final Exams | |
| | Total | |
| | Total work load / 30 hr | |
| | ECTS Credit of the Course | |
| | Total | 100.00 |
| | Measurement and Evaluation Techniques Used in the Course | |
| **24** | **ECTS / WORK LOAD TABLE** | |

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

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ÖK3** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK4** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK5** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK6** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK7** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 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** |
|---|---|---|---|---|---|