# ANALYSIS I

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| 1 | Course Title: | ANALYSIS I |
| 2 | Course Code: | İMT1007 |
| 3 | Type of Course: | Compulsory |
| 4 | Level of Course: | First Cycle |
| 5 | Year of Study: | 1 |
| 6 | Semester: | 1 |
| 7 | ECTS Credits Allocated: | 10.00 |
| 8 | Theoretical (hour/week): | 4.00 |
| 9 | Practice (hour/week): | 2.00 |
| 10 | Laboratory (hour/week): | 0 |
| 11 | Prerequisites: | None |
| 12 | Language: | Turkish |
| 13 | Mode of Delivery: | Face to face |
| 14 | Course Coordinator: | Dr. Ögr. Üyesi BAHTİYAR BAYRAKTAR |
| 15 | Course Lecturers: | |
| 16 | Contact information of the Course Coordinator: | E-mail: bbayraktar@uludag.edu.tr, İş Tel: +90(224) 294 22 98. Adres: UÜ, Eğitim Fakültesi, İlköğretim Bölümü, Matematik Eğitimi Anabilim Dalı, 16059 Görükle / BURSA |
| 17 | Website: | |
| 18 | Objective of the Course: | The purpose of the course is to be able to examine development of limit, differential and integral calculus of theoretical structure in univariate functions and to gain skills in its interpreting. |
| 19 | Contribution of the Course to Professional Development: | |
| 20 | Learning Outcomes: | |

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| | 1 | Ability to define concept of progressions, concept of approach, concept of convergent and divergent sequences, concept of zillion and infinitesimal |
| | 2 | Ability to explain limit, continuity and differentiation concepts of univariate functions. |
| | 3 | Ability to explain limit, continuity, discontinuity and differentiation concepts of univariate functions. |
| | 4 | Ability to do examination of limit calculations and determination of continuity of function |
| | 5 | According to elementary functions, their reverses, definitions of closed and parametric function derivatives ability to calculate with formulas. |
| | 6 | Ability to solve derivative tasks( problem solving, analysis and graph drawing of function) |
| | 7 | Ability to interpret concept of differential of a function. Ability to use concept of differential in tasks related with approach calculations. |
| | 8 | Ability to use rule of L'Hospital in limit calculations. Ability to make Taylor extension of functions. |
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| 21 | Course Content: | |

| | | Course Content: | |
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| **Week** | **Theoretical** | | **Practice** |
| 1 | Progressions. Basic definitions and examples. Monotone progressions. Examples. Convergent, divergent progressions and their geometric meanings. Limited sequences. Zillion and Infinitesimal progressions. General theorems about sequences and practice tasks. | | Determination of characters of progressions. Examination of convergence of sequences. Practice of theorems. |
| 2 | Limit conception of univariate functions and its practice. Perfect limits. Limit calculation techniques. | | Limit calculation |
| 3 | Types of continuity and discontinuity. Properties of continuous functions | | Examination of continuity of functions. |
| 4 | Concept of derivative in univariate functions. Geometrical and physical interpretation of derivative. Rules of derivation. Features of derivation. | | Derivative calculations according to the definition of derivative. Derivative calculations. |
| 5 | Derivate of functions given in the form of closed and parametric ones. Derivative of inverse and compound functions. | | Derivative calculations. |
| 6 | Differential of function and its practice. | | Differential of the function and its practice |
| 7 | Midterm exam | | Midterm exam |
| 8 | High-ordered derivatives. Finite theorem of Taylor | | Practice of Taylor's formula. |
| 9 | Theorem of Role and Average Value Theorem. L'Hospital rule and limit calculations according to this rule. | | L'Hospital rule and limit calculations according to this rule. |
| 10 | Practice for derivative: Ascending and descending intervals of function. Concavity direction of a curve. Bending points. Asymptotes. Extreme points of function. | | Extreme points of function and absolute extrema points. Maximum and minimum problems. |
| 11 | Practice for derivative: Ascending and descending intervals of function. Concavity direction of a curve. Bending points. Asymptotes. Extreme points of function. | | Extreme points of function and absolute extrema points. Maximum and minimum problems. |
| 12 | Absolute extreme points of a function. Maximum and minimum problems. | | Maximum and minimum problems. |
| 13 | Analyse of function and graphic drawing. Examples | | Analyse of function and graphic drawing |
| 14 | Analyse of function and graphic drawing. Examples | | Analyse of function and graphic drawing |
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| 22 | Textbooks, References and/or Other Materials: | | 1. Prof. Dr. Ahmet A. KARADENIZ High Mathematics. Volume 1, 2nd, 4th Edition, 1985. 2. Professor. Mustafa BAYRAKTAR Introduction analysis I, II. 2nd Edition, 2008. 3. Prof. Dr. Mustafa BALCI, Analysis 1.2. 7.Edition, 2008. 4. Assoc. Dr. Ahmet TEKCAN, Advanced Analysis. DORA 2010. |
| 23 | Assesment | | |

| TERM LEARNING ACTIVITIES | NUMBER | WEIGHT |
|---|---|---|
| Midterm Exam | 1 | 40.00 |
| Quiz | 0 | 0.00 |

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| Home work-project | 0 | 0.00 |
| Final Exam | 1 | 60.00 |
| Total | 2 | 100.00 |
| Contribution of Term (Year) Learning Activities to Success Grade | 40.00 | |
| Contribution of Final Exam to Success Grade | 60.00 | |
| Total | 100.00 | |
| Measurement and Evaluation Techniques Used in the Course | | |

| 24 | ECTS / WORK LOAD TABLE |
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| Activites | Number | Duration (hour) | Total Work Load (hour) |
|---|---|---|---|
| Theoretical | 14 | 4.00 | 56.00 |
| Practicals/Labs | 14 | 2.00 | 28.00 |
| Self study and preperation | 13 | 8.00 | 104.00 |
| Homeworks | 0 | 0.00 | 0.00 |
| Projects | 0 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Midterm exams | 1 | 10.00 | 10.00 |
| Others | 0 | 0.00 | 0.00 |
| Final Exams | 1 | 12.00 | 12.00 |
| Total Work Load | | | 210.00 |
| Total work load/ 30 hr | | | 7.00 |
| ECTS Credit of the Course | | | 10.00 |

| 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 | 5 | 0 | 5 | 3 | 5 | 5 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK2 | 5 | 0 | 5 | 4 | 5 | 5 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK3 | 5 | 0 | 5 | 3 | 5 | 3 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK4 | 5 | 0 | 5 | 3 | 5 | 3 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK5 | 5 | 0 | 5 | 4 | 5 | 5 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK6 | 5 | 0 | 5 | 4 | 5 | 5 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK7 | 5 | 0 | 5 | 4 | 5 | 5 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK8 | 5 | 0 | 5 | 4 | 5 | 4 | 3 | 2 | 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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