

# ANALYSIS I

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|------|---|--|---|
| 1    | Course Title:   | ANALYSIS I   |   |
| 2    | Course Code:  | MAT1001  |   |
| 3    | Type of Course:   | Compulsory   |   |
| 4    | Level of Course:  | First Cycle  |   |
| 5    | Year of Study:  | 1  |   |
| 6    | Semester:   | 1  |   |
| 7    | ECTS Credits Allocated:                                 | 8.00   |   |
| 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:                                     | Prof. Dr. İSMAİL NACİ CANGÜL   |   |
| 15   | Course Lecturers:                                       | Prof. Dr. Metin ÖZTÜRK, Prof. Dr. Sibel YALÇIN TOKGÖZ, Prof. Dr. Osman BİZİM, Doç. Dr. Ahmet TEKCAN, Yrd. Doç. Dr. Musa DEMİRCİ, Yrd. Doç. Dr. Hacer ÖZDEN |   |
| 16   | Contact information of the Course Coordinator:          | cangul@uludag.edu.tr, 0224 2941756, Fen-Edebiyat Fakültesi, Matematik Bölümü, 16059, Görükle / Bursa   |   |
| 17   | Website:  | <a href="http://homepage.uludag.edu.tr/~cangul/derslerim.html">http://homepage.uludag.edu.tr/~cangul/derslerim.html</a>                                    |   |
| 18   | Objective of the Course:                                | To give the notions such as function, sequence, limit, continuity and derivative in detail   |   |
| 19   | Contribution of the Course to Professional Development: |  |   |
| 20   | Learning Outcomes:                                      |  |   |
|      |   | 1  | Knows the fundamental notions of Analysis   |
|      |   | 2  | Can apply the fundamental notions of Analysis   |
|      |   | 3  | Can comment on the fundamental notions of Analysis geometrically, physically, etc.                            |
|      |   | 4  | Can transfer between cartesian, polar and parametric coordinate systems and can differentiate the differences |
|      |   | 5  | Knows the origins and history of the main notions   |
|      |   | 6  | Knows the corresponding English meanings of the main notions  |
|      |   | 7  |   |
|      |   | 8  |   |
|      |   | 9  |   |
|      |   | 10   |   |
| 21   | Course Content:   |  |   |
|      |   | <b>Course Content:</b>   |   |
| Week | Theoretical   | Practice   |   |
| 1    | Sets  | Examples of sets and set operations  |   |
| 2    | Numbers   | Examples of number sets  |   |

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| 3  | Relations and Functions  | Examples of relations and functions, operations of functions   |
| 4  | Sequences  | Examples of sequences, subsequences, calculation of the terms of the sequence, limit of a sequence, arithmetic and geometric sequences |
| 5  | Limit  | Calculation of limit in real numbers and extended real numbers   |
| 6  | Indefinite cases   | Examples of indefinite cases   |
| 7  | Differential and approximation   | Use of differential in approximations  |
| 8  | Definition of derivative   | Examples of basic derivation rules   |
| 9  | Midterm exam and general review  | General review   |
| 10 | Geometric and physical meaning of derivative, higher order derivatives | Slope, tangent and normal line, examples of relations between speed, acceleration and length of motion                                 |
| 11 | Derivatives of implicit and inverse functions, extremum problems       | Examples of extremum problems  |
| 12 | Increasing-decreasing functions, inflection points                     | Examples of increasing-decreasing functions and inflection points  |
| 13 | Other applications of derivative                                       | Examples of applications of derivative in other areas  |
| 14 | Drawing graphs of rational functions                                   | Examples of drawing graphs of rational functions and briefly other functions   |

| 22                         | Textbooks, References and/or Other Materials | Calculus, İsmail Naci CANGÜL (Editör), Nobel Yayınları, 2019 |                 |                        |
|----------------------------|--|--|-----------------|------------------------|
| Activities                 |  | Number   | Duration (hour) | Total Work Load (hour) |
| 23                         | Theoretical Assessment                       | 14   | 4.00            | 56.00                  |
| Practicals/Labs            |  | 14   | 2.00            | 28.00                  |
| Self study and preparation |  | 14   | 7.00            | 98.00                  |
| Midterm Exam               |  | 1  | 0.00            | 0.00                   |
| Homeworks                  |  | 0  | 0.00            | 0.00                   |
| Projects                   |  | 0  | 0.00            | 0.00                   |
| Home work-project          |  | 0  | 0.00            | 0.00                   |
| Field Studies              |  | 0  | 0.00            | 0.00                   |
| Midterm exams              |  | 2  | 10.00           | 20.00                  |
| Total                      |  | 46   | 20.00           | 20.00                  |
| Others                     |  | 0  | 0.00            | 0.00                   |
| Final Exam                 |  | 1  | 34.00           | 34.00                  |
| Total Work Load            |  |  |                 | 236.00                 |
| Total work load/ 30 hr     |  | 100.00   |                 | 7.87                   |
| ECTS Credit of the Course  |  |  |                 | 8.00                   |

**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   | 0   | 0   | 5   | 0   | 0   | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| ÖK2 | 5   | 0   | 0   | 5   | 0   | 0   | 5   | 4   | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| ÖK3 | 5   | 3   | 0   | 0   | 5   | 0   | 2   | 4   | 0   | 3    | 0    | 0    | 0    | 0    | 0    | 0    |

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|--|-------------------|---|---|--------------|---|---|-----------------|---|---|---------------|---|---|--------------------|---|---|---|
| <b>ÖK4</b>   | 2                 | 4 | 0 | 0            | 5 | 0 | 2               | 5 | 0 | 0             | 0 | 0 | 0                  | 0 | 0 | 0 |
| <b>ÖK5</b>   | 0                 | 0 | 0 | 0            | 5 | 0 | 0               | 2 | 0 | 3             | 0 | 0 | 0                  | 0 | 0 | 0 |
| <b>ÖK6</b>   | 0                 | 0 | 0 | 0            | 0 | 5 | 0               | 0 | 0 | 3             | 0 | 0 | 0                  | 0 | 0 | 0 |
| <b>LO: Learning Objectives    PQ: Program Qualifications</b> |                   |   |   |              |   |   |                 |   |   |               |   |   |                    |   |   |   |
| <b>Contribution Level:</b>                                   | <b>1 very low</b> |   |   | <b>2 low</b> |   |   | <b>3 Medium</b> |   |   | <b>4 High</b> |   |   | <b>5 Very High</b> |   |   |   |