

| Course Code   | Course Name   | Teorical | Practice | Laboratory | Credits | ECTS |
|---|---|----------|----------|------------|---------|------|
| MAT215  | ANALYTIC GEOMETRY   | 3.00     | 0.00     | 0.00       | 3.00    | 6.00 |
| Course Detail   |   |          |          |            |         |      |
| <b>Course Language</b>                                  | : English   |          |          |            |         |      |
| <b>Qualification Degree</b>                             | : Bachelor  |          |          |            |         |      |
| <b>Course Type</b>                                      | : Compulsory  |          |          |            |         |      |
| <b>Preconditions</b>                                    | : Available   |          |          |            |         |      |
| <b>Objectives of the Course</b>                         | : The objective of this course is to emphasize the connection between linear algebra and geometry. Besides basic concepts used to describe and measure real life objects such as conic sections and quadric surfaces are discussed.   |          |          |            |         |      |
| <b>Course Contents</b>                                  | : Cartesian Coordinates in the Plane, Lines in the Plane, Polar Coordinates, Change of Coordinates in the Plane, Cartesian Coordinates in 3-space, Vectors in the Plane, Conic Sections, The General Quadratic Equation (in 2 Variables), Vectors in 3-space, Scalar Product, Cross Product, Lines in 3-space, Planes, Distance from a Point to a Plane or to a Line, Intersection of Three Planes, Surfaces, Canonical Equations of Quadric Surfaces, Change of Coordinates in 3-space, The General Quadratic Equation (in 3 Variables). |          |          |            |         |      |
| <b>Recommended or Required Reading</b>                  | : Analytic Geometry, H. İ. KARAKAŞ, METU Press, 2012./Analitik Geometri, M. BALCI, Palme Publications, 2016./Çözümlü Analitik Geometri Problemleri, M. BALCI, Palme Publications, 2016.   |          |          |            |         |      |
| <b>Planned Learning Activities and Teaching Methods</b> | : Face to face and interactive education.   |          |          |            |         |      |
| <b>Recommended Optional Programme Components</b>        | : None  |          |          |            |         |      |
| <b>Instructors</b>                                      | : Assoc. Prof. Dr. Vahide Bulut   |          |          |            |         |      |
| <b>Instructor's Assistants</b>                          | : None  |          |          |            |         |      |
| <b>Presentation Of Course</b>                           | : Face to face instructing  |          |          |            |         |      |
| <b>En Son Güncelleme Tarihi:</b>                        | : 2/29/2024 11:32:47 AM   |          |          |            |         |      |

## Course Outcomes

## Upon the completion of this course a student :

- 1 To learn lines and vectors in 2D space
- 2 To identify conic sections by the general equation of a conic section or their specific equations.
- 3 To simplify an equation in 2 variables into the equation of a conic section by using change of coordinates.
- 4 To learn the relation between vectors, lines, and planes in 3-space.
- 5 To identify basic surfaces such as cylinders, spheres, and surfaces of revolution.

## Preconditions

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|-------------|-------------------------|----------|----------|------------|---------|------|
| MAT208      | UYGULAMALI LİNEER CEBİR | 3.00     | 0.00     | 0.00       | 3.00    | 5.00 |

| Weekly Contents |   |          |            |                  |   |                          |
|-----------------|---|----------|------------|------------------|---|--------------------------|
|                 | Teorical  | Practice | Laboratory | Preparation Info | Teaching Methods  | Course Learning Outcomes |
| 1.Week          | *Cartesian Coordinates in The Plane, Lines in the Plane, Graphs of Relations from Real Numbers to Real Numbers. |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 2.Week          | *Polar Coordinates, Change of Coordinates: Rotation and Translation   |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 3.Week          | *Cartesian Coordinates in 3-space, Vectors.   |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 4.Week          | *Algebra of Vectors, Scalar Product, Angle Between Two Vectors.   |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 5.Week          | *Lines, Half-Lines and Line Segments, More about Lines: Distance, Symmetry, Bisectors.                          |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 6.Week          | *Definition and General Equation of a Conic Section, The Parabola.  |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 7.Week          | *Central Conics, The Ellipse.   |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 8.Week          | *The Hyperbola, The Asymptotes of an Hyperbola.   |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 9.Week          | *The General Quadratic Equation, Vectors in 3-space.  |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 10.Week         | *Algebra of Vectors in 3-space, Scalar Product, Angle Between Two Vectors.                                      |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 11.Week         | *Cross Product, Lines in 3-space.   |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 12.Week         | *Intersection of Three Planes, Spheres and Cylinders<br>*Planes, Distance Form a Point to a Plane or a Line.    |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 13.Week         | *Surfaces of Revolution, Canonical Equations of the Quadric Surfaces.   |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |
| 14.Week         | *Change of Coordinates in 3-space, The General Quadratic Equation.  |          |            |                  | *Oral presentation, digital presentation, question and answer |                          |

| Assesment Methods % |
|---------------------|
| 1 Midterms : 40.000 |
| 2 Final : 60.000    |

| ECTS Workload   |       |            |                                   |
|---|-------|------------|-----------------------------------|
| Activities  | Count | Time(Hour) | Sum of Workload                   |
| Vize / Midterms   | 1     | 2.00       | 2.00                              |
| Final / Final   | 1     | 2.00       | 2.00                              |
| Ödev / Assignment   | 0     | 0.00       | 0.00                              |
| Derse Katılım / Attending lectures                              | 15    | 3.00       | 45.00                             |
| Ders Öncesi Biresysel Çalışma / Individual study before lecture | 15    | 3.00       | 45.00                             |
| Ders Sonrası Biresysel Çalışma / Individual study after lecture | 15    | 3.00       | 45.00                             |
| Ara Sınav Hazırlık / Preparation for midterm                    | 1     | 24.00      | 24.00                             |
| Final Sınavı Hazırlık / Preparation for final                   | 1     | 30.00      | 30.00                             |
|   |       |            | Total : 193.00                    |
|   |       |            | Sum of Workload / 30 ( Hour ) : 6 |
|   |       |            | ECTS : 6.00                       |

