| FRACTAL GEOMETRY | | | | | | | | | | | |
|--------------------|--|--|--|--|--|--|--|--|--|--|--|
| 1 | Course Title: | FRACTA | L GEOMETRY | | | | | | | | |
| 2 | Course Code: | MAT408 | 5 | | | | | | | | |
| 3 | Type of Course: | Optional | | | | | | | | | |
| 4 | Level of Course: | First Cyc | le | | | | | | | | |
| 5 | Year of Study: | 4 | | | | | | | | | |
| 6 | Semester: | 7 | | | | | | | | | |
| 7 | ECTS Credits Allocated: | 5.00 | | | | | | | | | |
| 8 | Theoretical (hour/week): | 3.00 | 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 f | ace | | | | | | | | |
| 14 | Course Coordinator: | Prof. Dr. | ESEN İYİGÜN | | | | | | | | |
| 15 | Course Lecturers: | | | | | | | | | | |
| 16 | Contact information of the Course Coordinator: | e-posta: telefon: (adres: U Bölümü, | a: esen@uludag.edu.tr : 0.224.2941766 Uludağ Üniversitesi, Fen-Edebiyat Fakültesi, Matematik ü, 16059, Görükle Kampüsü, Bursa | | | | | | | | |
| 17 | Website: | | | | | | | | | | |
| 18 | Objective of the Course: | The aim of the course is to teach students to fractal geometry with properties, dimension, self-similarity and examples in nature. | | | | | | | | | |
| 19 | Contribution of the Course to Professional Development: | | | | | | | | | | |
| 20 | Learning Outcomes: | | | | | | | | | | |
| | | 1 | Introduces the concept of fractal and teaches history of fractals. | | | | | | | | |
| | | 2 | Teaches to obtain new shapes from the usual geometric shapes. | | | | | | | | |
| | | 3 | Teaches geometry of transformations in the plane. | | | | | | | | |
| | | 4 | Teaches self-similarity which is one of the important properties of fractals. | | | | | | | | |
| | | 5 | Teaches how to calculate of the dimension by introducing the concept of dimension in some special fractals. | | | | | | | | |
| | | 6 | Teaches the calculation of the length of a fractal curve. | | | | | | | | |
| | | 7 | Introduces examples of fractals in nature. | | | | | | | | |
| | | 8 | | | | | | | | | |
| | | 9 | | | | | | | | | |
| | | 10 | | | | | | | | | |
| 21 Course Content: | | | | | | | | | | | |
| | | Co | ourse Content: | | | | | | | | |
| Week | Theoretical | | Practice | | | | | | | | |
| 1 | Course description, content and hist | ory. | | | | | | | | | |
| 2 | Known examples of fractals. | | | | | | | | | | |
| 3 | Polygon, circle ve square fractals. | | | | | | | | | | |

| 4 | Fill space curves. | | | | | | | | | | | | | | | | | | | |
|-----------------|---|---------------|------------------|-------------------|------------------|--------------------|---------|------|-----|---|----------|------|------|----------|-------|---------------------------|-------|--|--|--|
| 5 | Geometry of transformations in the plane. | | | | | | | | | | | | | | | | | | | |
| 6 | Self-similarity in fractals. | | | | | | | | | | | | | | | | | | | |
| 7 | Dimension in some special fractals. | | | | | | | | | | | | | | | | | | | |
| 8 | Midterm and repeating courses. | | | | | | | | | | | | | | | | | | | |
| 9 | Koch curve and calculation of dimension. | | | | | | | | | | | | | | | | | | | |
| 10 | Mink dime | owsl ensio | ki frac n, Ha | tal and usdorf | d calc f dime | ulation ension. | of | | | | | | | | | | | | | |
| 11 | Length of a fractal curve, Length paradox of Koch curve. | | | | | | | | | | | | | | | | | | | |
| 12 | Calculation dimension with box counting method. | | | | | | | | | | | | | | | | | | | |
| 13 | Simi | larity | in siz | e, Mo | ran eo | quation | l. | | | | | | | | | | | | | |
| 14 | Appl | icatio | on in r | nature | belon | iging to | o fract | als. | | | | | | | | | | | | |
| 22 | Textbooks, References and/or Other Materials: | | | | | | | | | Prof. Dr.H.Hilmi Hacısalihoğlu, Araş.Gör. Nergis Yaz, Fraktal Geometri I, Ankara Üniversitesi Fen Fakültesi, Matematik Bölümü, Ankara, 2007. | | | | | | | | | | |
| 23 | Asse | esme | nt | | | | | | | | | | | | | | | | | |
| TERM L | EAR | NING | ACTI | VITIES | | | N F | | WE | WEIGHT | | | | | | | | | | |
| Midtern | n Exa | m | | | | | 1 | | 40 | 40.00 | | | | | | | | | | |
| Activit | Activites | | | | | | | | | Numb | er | | Dura | ition (| hour) | Total Work Load (hour) | | | | |
| Theo re | etical | | | | | | 2 | | 10 | 10400 | | | 3.00 | | 42.00 | | | | | |
| Practica | als/La | abs | | | | | | | (| 0 | | | 0.00 | 0.00 | | | 0.00 | | | |
| Self stu | Success Grade Self study and preperation | | | | | | | | ŀ | 14 | | | 4.00 | | | 56.00 | | | | |
| Homew | vorks | | | | | | | | ſ | 14 | | | 2.00 | | | 28.00 | | | | |
| ₽₽¢ #ect | s | | | | | | | | 10 | 0.00 | | | 0.00 | 0.00 | | | | | | |
| Field S | tudies | S | | | | | | | (| 0 | | | 0.00 | 0.00 | | | 0.00 | | | |
| Mourse | diam exams | | | | | | | | | 1 | | | | | | 11 00 | | | | |
| Others | hers | | | | | | | | | 0 | | | | | | 0.00 | | | | |
| Final E | al Exams | | | | | | | | | | 1 | | | | | 13.00 | | | | |
| Total W | tal Work Load | | | | | | | | | | 150 | | | | | 150.00 | 50.00 | | | |
| Total w | otal work load/ 30 hr | | | | | | | | | 5.00 | | | | | | | | | | |
| ECTS (| TS Credit of the Course | | | | | | | | | 5.00 | | | | | | | | | | |
| 25 | 25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS | | | | | | | | | | | | | | | | | | | |
| | F | PQ1 | PQ2 | PQ3 | PQ4 | PQ5 | PQ6 | PQ7 | PQ8 | PQ9 | PQ1 0 | PQ11 | PQ12 | PQ1 3 | PQ14 | PQ15 | PQ16 | | | |
| ÖK1 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| ÖK2 | (| C | 0 | 0 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| ÖK3 | C | C | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | |

| ÖK5 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|--|--------------|---|-------|---|----------|---|---|--------|---|---|-------------|---|---|---|---|---|
| ÖK6 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK7 | 4 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LO: Learning Objectives PQ: Program Qualifications | | | | | | | | | | | | | | | | |
| Contrib ution Level: | 0 1 very low | | 2 low | | 3 Medium | | | 4 High | | | 5 Very High | | | | | |