

ANALYTIC NUMBER THEORY

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| 1 | Course Title: | ANALYTIC NUMBER THEORY | |
| 2 | Course Code: | MAT3052 | |
| 3 | Type of Course: | Optional | |
| 4 | Level of Course: | First Cycle | |
| 5 | Year of Study: | 3 | |
| 6 | Semester: | 6 | |
| 7 | ECTS Credits Allocated: | 5.00 | |
| 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. İSMAİL NACİ CANGÜL | |
| 15 | Course Lecturers: | 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: | http://www.ismailnacicangul.com/ | |
| 18 | Objective of the Course: | To obtain results concerning the distribution of prime numbers and to make an introduction to analytic numbers | |
| 19 | Contribution of the Course to Professional Development: | | |
| 20 | Learning Outcomes: | | |
| | | 1 | Can define prime numbers and state the known results on their distribution |
| | | 2 | Can establish relations between arithmetic functions |
| | | 3 | Can apply the theorems on the distribution of prime numbers |
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| 21 | Course Content: | | |
| | | Course Content: | |
| Week | Theoretical | Practice | |
| 1 | Prime number theorem | | |
| 2 | Results of the prime number theorem | | |
| 3 | The analytic proof of prime number theorem | | |
| 4 | Fundamental theorem of arithmetic | | |

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| 5 | Arithmetic functions | |
| 6 | Dirichlet Product of Arithmetic functions | |
| 7 | Mobious inversion Formula | |
| 8 | Applications of Mobious inversion Formula | |
| 9 | Relations between aritmetic functions | |
| 10 | Primitive roots | |
| 11 | Quadratic reciprocity law | |
| 12 | Legendre symbol | |
| 13 | Quadratic congruences | |
| 14 | Riemann-Zeta function | |

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| 22 | Textbooks, References and/or Other Materials: | 1. Tom M. Apostol, Introduction to Analytic Number Theory, Springer, 2000 2. Kiran Sridhara Kedlaya, Analytic Number Theory, (Ders notları) MIT, 2006 3. Paul T. Bateman and Harold G. Diamond, Analytic Number Theory an Introductory Course, world Scientific, 2009 |
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| 23 | Assesment | |
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| TERM LEARNING ACTIVITIES | | NUMBE R | WEIGHT |
|------------------------------------------------------------------|--|------------|--------|
| Midterm Exam | | 0 | 0.00 |
| Quiz | | 0 | 0.00 |
| Homeworks, Performances | | 2 | 50.00 |
| Final Exam | | 1 | 50.00 |
| Total | | 3 | 100.00 |
| Contribution of Term (Year) Learning Activities to Success Grade | | | 50.00 |
| Contribution of Final Exam to Success Grade | | | 50.00 |
| Total | | | 100.00 |
| Measurement and Evaluation Techniques Used in the Course | | | |

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| 24 | ECTS / WORK LOAD TABLE |
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| 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 | 4.00 | 56.00 |
| Homeworks, Performances | 2 | 20.00 | 40.00 |
| Projects | 0 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Midterm exams | 0 | 0.00 | 0.00 |
| Others | 0 | 0.00 | 0.00 |
| Final Exams | 1 | 15.00 | 15.00 |
| Total Work Load | | | 153.00 |
| Total work load/ 30 hr | | | 5.10 |
| ECTS Credit of the Course | | | 5.00 |

| 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 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK2 | 0 | 4 | 0 | 0 | 5 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ÖK3 | 0 | 4 | 0 | 0 | 5 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LO: Learning Objectives PQ: Program Qualifications | | | | | | | | | | | | | | | | |
| Contrib ution Level: | 1 very low | | 2 low | | | 3 Medium | | | 4 High | | | 5 Very High | | | | |