# ALGEBRAIC TOPOLOGY I

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| 1 | Course Title: | ALGEBRAIC TOPOLOGY I |
| 2 | Course Code: | MAT4077 |
| 3 | Type of Course: | Optional |
| 4 | Level of Course: | First Cycle |
| 5 | Year of Study: | 4 |
| 6 | Semester: | 7 |
| 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. OSMAN BİZİM |
| 15 | Course Lecturers: | Prof. Dr. Osman Bizim |
| 16 | Contact information of the Course Coordinator: | Uludağ Üniversitesi, Fen-Edebiyat Fakültesi<br>Matematik Bölümü, Görükle Bursa-TÜRKİYE 0 224 294 17 50 / obizim@uludag.edu.tr |
| 17 | Website: | |
| 18 | Objective of the Course: | The aim of this course to give the basic principals of algebraic topology. |
| 19 | Contribution of the Course to Professional Development: | |
| 20 | Learning Outcomes: | |
| | 1 | Learns topological groups and their properties. |
| | 2 | Learns group action on a space. |
| | 3 | Learns Brower-fixed point theorem and its applications. |
| | 4 | Learns categories and functors. |
| | 5 | Learns the path, the path-connected topological spaces and local path connected topological spaces. |
| | 6 | Learns the basic concepts of algebraic toplogy. |
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| 21 | Course Content: | |

**Course Content:**

| Week | Theoretical | Practice |
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| 1 | Topological Groups and their properties | |
| 2 | The acts of a group on a topological group and its properties | |
| 3 | The Brower-fixed point theorem and its applications | |
| 4 | Categories | |

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| **5** | Functors | |
| **6** | The path in the topological spaces and their properties | |
| **7** | The connected and path-connected topological spaces and the relations between them | |
| **8** | The local path connected topological spaces and its applications | |
| **9** | Two dimensional manifolds and their properties | |
| **10** | Orientable and nonorientable surfaces and their properties | |
| **11** | Connected two dimensional manifolds and their properties | |
| **12** | The classification theorem of compact surfaces and their properties | |
| **13** | Triangulation of compact surfaces | |
| **14** | The Euler caracteristic of surfaces | |

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| **22** | Textbooks, References and/or Other Materials: | 1. W. S. Massey, A Basic Course in Algebraic Toplogy, Springer-Verlag, 1991.<br>2. M.J. Greenberg, J.R. Harper, Algebraic Topolgy, A First Course, Addison-Wesley, 1981.<br>3. J. Munkres, Topology, Prentice-Hill, 2.Ed. 2000. |
| **23** | Assesment | |

| 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 | 2.00 | 28.00 |
| Homeworks | 0 | 0.00 | 0.00 |
| Projects | 0 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Midterm exams | 1 | 20.00 | 20.00 |
| Others | 14 | 2.00 | 28.00 |
| Final Exams | 1 | 32.00 | 32.00 |
| Total Work Load | | | 150.00 |
| Total work load/ 30 hr | | | 5.00 |
| ECTS Credit of the Course | | | 5.00 |

| Measurement and Evaluation Techniques Used in the Course | | | |
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| Quiz | 0 | 0.00 | |
| Mid Term Exam | 1 | 60.00 | |
| Contribution of Term (Year) Learning Activities to Success Grade | | 40.00 | |
| Contribution of Final Exam to Success Grade | | 60.00 | |

**24 ECTS / WORK LOAD TABLE**

| **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 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK2** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK3** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK4** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |

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| **ÖK5** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK6** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 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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