# INTRODUCTION TO MICROELECTROMECHANICAL SYSTEMS

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| 1 | Course Title: | INTRODUCTION TO MICROELECTROMECHANICAL SYSTEMS |
| 2 | Course Code: | EEM4503 |
| 3 | Type of Course: | Optional |
| 4 | Level of Course: | First Cycle |
| 5 | Year of Study: | 4 |
| 6 | Semester: | 7 |
| 7 | ECTS Credits Allocated: | 4.00 |
| 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: | Doç. Dr. ESİN KARPAT |
| 15 | Course Lecturers: | Yok |
| 16 | Contact information of the Course Coordinator: | Dr. Öğr. Üye. Esin KARPAT<br>Mühendislik Fakültesi Elektrik-Elektronik Mühendisliği Bölümü<br>Ofis:320<br>0.224.294 20 20 |
| 17 | Website: | |
| 18 | Objective of the Course: | The aim of the lectures is to give an overview of the Microelectromechanic systems world and the MEMS devices. It has been structured so to introduce the main features and properties of Microelectromechanical systems and their current and potential advantages which mainly derive from miniaturization and the evolution of the standard IC technological approach. |
| 19 | Contribution of the Course to Professional Development: | They gain the knowledge about the material technology of the new age and the designs of micro-sized sensors, robots and devices of the future. |
| 20 | Learning Outcomes: | |

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| | 1 | To be able to gain an interdisciplinary overview of the current state of MEMS |
| | 2 | To be able to learn microfabrication methods |
| | 3 | To be able to learn different applications of MEMS |
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| 21 | Course Content: | |
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## Course Content:

| Week | Theoretical | Practice |
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| 1 | Introduction to MEMS. | |

| 2 | History of Micro electromechanical systems | |
|---|---|---|
| 3 | Applications of MEMS | |
| 4 | Materials | |
| 5 | Design Principles (Scaling) | |
| 6 | Mems products | |
| 7 | Microfabrication - Bulk | |
| 8 | Microfabrication-Micro surface | |
| 9 | Repeating courses | |
| 10 | MEMS devices (Digital micromirrors, accelerometers, etc) | |
| 11 | Microsensors (chemical, biological, mechanical, etc) | |
| 12 | MEMS Actuators. | |
| 13 | Future of MEMS | |

| 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 | 0 | 0.00 | 0.00 |
| Homeworks | 1 | 42.00 | 42.00 |
| Projects | 0 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Midterm exams | 0 | 2.00 | 2.00 |
| Others | 0 | 0.00 | 0.00 |
| Final Exams | 2 | 6.00 | 6.00 |
| Total Work Load | | | 120.00 |
| Total Work load/ 30 hr | | | 4.00 |
| ECTS Credit of the Course | | | 4.00 |

| 22 | Textbooks, References and/or Other Materials: | An Introduction to Microelectromechanical Systems Engineering, Nadim Maluf,Artech House Incorporated, |
|---|---|---|

| 23 | Assesment | | | |
|---|---|---|---|---|
| **TERM LEARNING ACTIVITIES** | **NUMBE** | **WEIGHT** | | |
| Midterm Exam | 1 | 40.00 | | |
| Homework/project | 0 | 0.00 | | |
| Final Exam | 2 | 100.00 | | |
| Total | | 100.00 | | |
| Measurement and Evaluation Techniques Used in the Course | | Measurement and evaluation is carried out according to the priciples of Bursa uludag University Associate and Undergraduate Education Regulation. | | |

| 24 | **ECTS / WORK LOAD TABLE** |
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| 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** | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK2** | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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