

| <b>Course Description Form</b>  |  |
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| <b>Course Code and Name</b>   | CENG318 MICROPROCESSORS  |
| <b>Course Semester</b>  | 6  |
| <b>Catalog Content</b>  | Microprocessor basic concepts, processor architectures, memory addressing and addressing modes, programming with assembly language, stack and segments, data segment and data types, arithmetic and logic instruction sets, branch and loop usage, interrupts, BIOS programming, macros, signed numbers and arrays.  |
| <b>Textbook</b>   | The Intel Microprocessors (8th Edition) by Barry B. Brey, 2008.  |
| <b>Supplementary Textbooks</b>  | Antonakos, James L., An introduction to the Intel family of microprocessors, Prentice Hall, 1999.<br><br>Microprocessors and Microcontrollers (Second Edition) by R.S. Kaler, 2013.  |
| <b>Credit</b>   | 6  |
| <b>Prerequisites of the Course</b><br>(Attendance Requirements)   | There is no prerequisite or co-requisite for this course.  |
| <b>Type of the Course</b>   | Compulsory   |
| <b>Instruction Language</b>   | English  |
| <b>Course Objectives</b>  | It is aimed to be learned the structure of microprocessors, memory addressing, addressing modes, segments, stacks, command sets and implementing all concepts with assembly language during laboratory hours.  |
| <b>Course Learning Outcomes</b>   | <ol style="list-style-type: none"> <li>1. Having knowledge about microprocessors</li> <li>2. Learning microprocessor architectures, instruction sets, addressing modes.</li> <li>3. Learning concepts of stack, subroutine, macro, interrupts</li> <li>4. Learning the assembly language to develop low-level programs.</li> <li>5. Writing basic programs with assembly language</li> </ol>   |
| <b>Instruction Methods</b>  | The mode of delivery of this course is face to face.   |
| <b>Weekly Schedule</b>  | <ol style="list-style-type: none"> <li>1. Week: Introduction to microprocessors, basic concepts</li> <li>2. Week: Microprocessor architectures</li> <li>3. Week: Memory addressing, addressing modes,</li> <li>4. Week: Programming with assembly language</li> <li>5. Week: Programming with assembly language</li> <li>6. Week: Stacks and segments</li> <li>7. Week: Data segment and data types</li> <li>8. Week: Arithmetic and logic instruction sets</li> <li>9. Week: Arithmetic and logic instruction sets</li> <li>10. Week: Branch, call and loop usage</li> <li>11. Week: Interrupts, INT21H and INT10H instructions</li> <li>12. Week: BIOS programming</li> <li>13. Week: Macros</li> <li>14. Week: Signed numbers and arrays</li> </ol> |
| <b>Teaching and Learning Methods</b><br><i>(These are examples. Please fill which activities you use in the course)</i> | Weekly theoretical course hours: 3<br>Weekly practical course hours: 2<br>Reading Activities<br>Internet browsing, library work<br>Designing and implementing materials<br>Preparation of Midterm and Midterm Exam<br>Final Exam and Preparation for Final Exam  |

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| <b>Assessment Criteria</b>  |   | <b>Numbers</b>  | <b>Total Weighting (%)</b>    |                               |   |   |   |
|   | Midterm Exams                                 | 1   | 30                            |                               |   |   |   |
|   | Assignment                                    | 0   |                               |                               |   |   |   |
|   | Application                                   | 12  | 30                            |                               |   |   |   |
|   | Projects                                      | 0   |                               |                               |   |   |   |
|   | Practice                                      | 0   |                               |                               |   |   |   |
|   | Quiz  | 0   |                               |                               |   |   |   |
|   | Percent of In-term Studies (%)                |   | 60                            |                               |   |   |   |
|   | Percentage of Final Exam to Total Score (%)   |   | 40                            |                               |   |   |   |
| Attendance  |   |   |                               |                               |   |   |   |
| <b>Workload</b>   | <b>Activity</b>                               | <b>Total Number of Weeks</b>  | <b>Duration (weekly hour)</b> | <b>Total Period Work Load</b> |   |   |   |
|   | Weekly Theoretical Course Hours               | 14  | 3                             | 42                            |   |   |   |
|   | Weekly Tutorial Hours                         | 12  | 2                             | 0                             |   |   |   |
|   | Reading Tasks                                 | 14  | 2                             | 28                            |   |   |   |
|   | Studies                                       | 12  | 2                             | 24                            |   |   |   |
|   | Material Design and Implementation            | 9   | 3                             | 27                            |   |   |   |
|   | Report Preparing                              |   |                               | 0                             |   |   |   |
|   | Preparing a Presentation                      |   |                               | 0                             |   |   |   |
|   | Presentations                                 |   |                               | 0                             |   |   |   |
|   | Midterm Exam and Preparation for Midterm Exam | 1   | 15                            | 15                            |   |   |   |
|   | Final Exam and Preparation for Final Exam     | 1   | 15                            | 15                            |   |   |   |
|   | Other ( should be emphasized)                 |   |                               | 0                             |   |   |   |
|   | Total Workload                                |   |                               | 151                           |   |   |   |
|   | Total Workload / 25                           |   |                               | 6.04                          |   |   |   |
|   | Course Credit (ECTS)                          |   |                               | 6                             |   |   |   |
| <b>Contribution Level Between Course Learning Outcomes and Program Outcomes</b> | No  | Program Outcomes  | 1                             | 2                             | 3 | 4 | 5 |
|   | 1   | Sufficient knowledge on mathematics, science and computer engineering; ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems  |                               |                               |   |   | X |
|   | 2   | Ability to identify, define, formulate and solve complex engineering problems; ability to choose and apply appropriate analysis and modelling methods for these purposes  |                               |                               |   |   | X |
|   | 3   | Ability to design a complex system, process, device, software, algorithm, or product under realistic constraints and circumstances to meet certain requirements; ability to apply modern design techniques for this purpose | X                             |                               |   |   |   |
|   | 4   | Ability to choose, develop and use modern techniques and tools necessary for engineering applications; ability to effectively use computing technologies  |                               |                               |   | X |   |
|   | 5   | Ability to design and implement systems or experiments to solve engineering problems, collect and interpret data to evaluate and analyze the results of solutions   |                               |                               |   | X |   |
|   | 6   | Ability to work effectively in intradisciplinary and interdisciplinary teams or individually  |                               |                               |   | X |   |

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|   | 7   | Ability to efficiently prepare, evaluate and interpret reports   |   |   |   | X |  |
|   | 8   | Ability to make presentations and conduct effective verbal and written communication in Turkish and English  |   |   | X |   |  |
|   | 9   | Awareness of the necessity of lifelong learning; ability to access information, follow scientific and technological developments; ability to perpetually renew oneself | X |   |   |   |  |
|   | 10  | Awareness of professional and ethical responsibility, ability to act in accordance with ethical principles   | X |   |   |   |  |
|   | 11  | Ability to apply knowledge on project management, risk management and change management  | X |   |   |   |  |
|   | 12  | Awareness of entrepreneurship and innovation, ability to design and build sustainable systems  | X |   |   |   |  |
|   | 13  | Ability to devise local and global solutions to contemporary issues considering the effects of engineering applications on health, environment and security            | X |   |   |   |  |
|   | 14  | Awareness of the legal consequences of engineering solutions   | X |   |   |   |  |
|   | 15  | Ability to apply knowledge on software development process and documentation rules   |   |   |   | X |  |
|   | 16  | Knowledge on standards used in engineering applications  |   | X |   |   |  |
|   | 17  | Awareness of occupational health and security, information security and privacy  | X |   |   |   |  |
| <b>The Course's Lecturer(s) and Contact Information</b> | Lecturer Dr. Muhammet Ünal<br>muhunal@gazi.edu.tr |  |   |   |   |   |  |