CENG 111
Introduction to Computer Engineering Concepts
2013 Fall

Instructors:
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Tarhan Tursun, Ozcan Duling

Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Notes</th>
<th>Course Material</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>23.09</td>
<td>• Introduction [0.5 week] Course content, objectives, outline; Grading; Information about the homeworks, the labs, the exams; Newsgroup, Website</td>
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<tr>
<td>Week 2</td>
<td>30.09</td>
<td>• Computing and Computation [Tot.; 2 weeks] What is computing/computation?/Digital computation, analog computation and nature’s computation: Pros and Cons;</td>
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<td>Week 3</td>
<td>07.10</td>
<td>• Computing and Computation [Tot.: 2 weeks] Digital computation; Basic digital computational elements: Switches, transistors, vacuum tubes, water stream taps; How to make basic gates; How to build bigger/complex circuits; Boolean Logic – Digital Circuit connection; Truth table; 1-bit addition, N-bit addition; Memory: Using capacitance</td>
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<td>Week 4</td>
<td>14.10</td>
<td>• Binary Representation of: [0.5 week] Integers: 2s and 1s complement; Floating points (IEEE 754 standard); Characters (ASCII Table); Strings</td>
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<td>Week 5</td>
<td>21.10</td>
<td>• Von Neumann Architecture: Revisited: [0.5 week] Machine-level instructions; Fetch-Decode-Execute cycle and how it works; Different registers: MAR, MDR, IR, PC; The need for higher-level languages: assemblers and more</td>
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<td>• The world of programming and the zoo of programming languages: [0.5 week] Compiled vs interpreted languages; Programming paradigms: Imperative, Functional, Object-oriented, Declarative-Logical, Parallel-Concurrent; How do we choose among the paradigms and the available languages; Current trend.</td>
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<td>• ‘Simple’ data types [0.5 week] number: float, int; string; list: lists of numbers, strings and nested lists; variables and naming conventions; type function</td>
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Lab Schedule: -- To be announced later --

Credit Hours: (3-2) 4

Category content:
2 Computer Literacy and Programming credits + 1 Engineering Sciences credit + 1 Mathematics and Basic Sciences credit.

Catalog Description:
Introduction to the fundamentals of computer systems, including computer organization, operating systems, language processors and user interfaces. Introduction to algorithms and programming. Reasoning informally about the correctness and efficiency of programs. A functional programming language will be used for practical work.

Course Objectives:
To provide a basic understanding of fundamental concepts in computer science and engineering. To improve the skills to work with abstract notions for solving computational problems. Teaching a particular programming language is not a primary objective; the language will serve as a medium for experimentation.

Prerequisites: None

Textbooks:
• Introduction to programming concepts with case studies in Python, by G. Üçoluk and S. Kalkan.
### Week 6
28.10
- **29th is holiday due to “Cumhuriyet Bayramı”**
- **Introduction to operators [1 week]**
  - Operators on numbers: Addition, multiplication, division (integer and float); Operators on strings: Concatenation, repetition; Operators on lists: Length, access and membership operators, addition, deletion; BNF notation; Ordering: Explicit, implicit casting, Type conversion; Assignment, 1-type and r-type expressions; Expression evaluation

### Week 7
4.11
- **Conditionals and loops [1 week]**
  - Boolean values; Turing machine, Determinism, Discreteness and conditionals; if statements; while, for statements

### Week 8
11.11
- **Functions [Tot.: 2 weeks]**
  - System defined: type, length, print; using “import”; simple math functions; user defined: defining a function, value of functions, call by value and reference

### Week 9
18.11
- **Functions [Tot.: 2 weeks]**
  - Recursion

### Week 10
25.11
- **30.11.2011: Last day of withdrawal**

### Week 11
02.12
- **More on data types [Tot.: 3 weeks]**
  - Stack, queue, priority queue, tree and others.

### Week 12
09.12
- **More on data types [Tot.: 3 weeks]**
  - Stack, queue, priority queue, tree and others.

### Week 13
16.12
- **More on data types [Tot.: 3 weeks]**
  - Stack, queue, priority queue, tree and others.

### Week 14
23.12
- **Object oriented concepts [Tot.: 2 weeks]**
  - Why need objects? Member variables and methods: public vs. private members.

### Week 15
30.01
- **Object oriented concepts [Tot.: 2 weeks]**
  - Encapsulation, inheritance, polymorphism, etc. Examples with OOP.

### Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>%18</td>
</tr>
<tr>
<td>Take-home Exams (4)</td>
<td>%25</td>
</tr>
<tr>
<td>Labs</td>
<td>%32</td>
</tr>
<tr>
<td>Participation</td>
<td>%3</td>
</tr>
<tr>
<td>Final</td>
<td>%22</td>
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- Most assignments will be programming assignments (some could be exercises to be written up).
- Laboratory schedule will be announced later. Keep watching.
- Starting from week 4-5 the laboratory sessions will go in parallel with the lectures. You will be asked to solve problems by using the ideas introduced in the lectures of that week. Earlier lab sessions will build your computing/communicating literacy.

### Web:
To get to the web page of this course follow the links at “http://web.ceng.metu.edu.tr”

### Newsgroup:
The newsgroup “metu.ceng.course.111” (https://cow.ceng.metu.edu.tr/News/) is devoted to the announcements and discussion of course-related matters. You should check this newsgroup every day.