# Department of Engineering
## Undergraduate Program
## Fall 2017

## Course Information

Course Number & Title: ENGR 244, Engineering Computing
Prerequisites/Co-requisite: CSC 101 and MTH 133
Class time (Section 1): M 12:30-2:00 PM, B-B2-18, W 12:30-2:00 PM, B-B1-03
Class time (Section 2): M/W 2:15-3:45 PM, B-B1-08
Credit: 3 credits, 3 hours

## Instructor Information

Instructor: Dr.-Ing. habil. Martin Thomas Horsch
Email: martin.horsch@auis.edu.krd
Office: B-F2-18
Office Hours: M/T, 10:45-11:45 AM

## Course Description

*ENGR 244 Engineering Computing*
Introduction to computational engineering, data structures and algorithms, and numerical methods. This course is oriented towards acquiring programming practice. Using the C/C++ programming language, the participants develop codes, document, test and optimize them, and measure the achieved performance.

## Learning Outcomes

Upon successfully completing the course, the participants have acquired the ability and confidence to develop computer programs for solving engineering problems numerically, using the procedural programming paradigm and the C/C++ programming language. They are able to formulate problems clearly, implement the appropriate algorithms and data structures, debug and optimize the code, and discuss the required computational resources, i.e., memory and CPU time.

## Materials

- B. Stroustrup, *The C++ Programming Language*, 4th edn., Addison-Wesley, **2013**. (Primary source for the present course.)
- W. H. Press, S. A. Teukolsky, W. T. Vetterling, B. P. Flannery, *Numerical Recipes: The Art of Scientific Computing*, 3rd edn., Cambridge University Press, **2007**.

## Evaluation & Grading

**Major assessments**: The course includes a programming project, and there will be two written (mid-)term exams (two hours each). The grading will be based on the exams, assigned coursework, tutorial participation, and the project outcome (including presentation and written report).

Corresponding percentages:

- First term exam: 15% (Saturday, October 28, 4:30 – 6:30 PM, A-G-05)
- **Second term exam: 35% (Saturday, December 2, 4:00 – 6:00 PM, A-G-05)**
- Programming project: 30% (proposal 6%, code 8%, presentation 8%, report 8%)
- Assigned work: 10.5% (three assignments, 3.5% each)
- Tutorial sessions: 4.5% (for presenting at least once in the tutorial)
- Graded coding session: 05% (group work, Wed., October 25, 6:00 – 7:30 PM, B-B1-08)

The programming project can be conducted in **groups of two or three people**; this also applies to the project presentation and report, and the assigned coursework. Tutorial presentations may be individual or jointly by two people, provided that each presenter contributes in a substantial way. **The final code and written report need to be submitted by December 9, 2017.**

The general policies of the American University of Iraq, Sulaimani apply as detailed below. As usual, plagiarism, cheating, and other unacademic practices will not be tolerated.

<u>**Grading Scale**</u>

| | | | |
|---|---|---|---|
| A | (4.0) | 93 - 100 | Superior |
| A– | (3.7) | 90 - 92 | |
| B+ | (3.3) | 87 - 89 | Good |
| B | (3.0) | 83 - 86 | |
| B– | (2.7) | 80 - 82 | |
| C+ | (2.3) | 77 – 79 | Satisfactory |
| C | (2.0) | 73 - 76 | |
| C– | (1.7) | 70 - 72 | |
| D+ | (1.3) | 67 – 69 | Unsatisfactory |
| D | (1.0) | 60 - 66 | |
| F | (0) | Below 60 | Fail |

<u>**Course Policies and Expectations**</u>

**While You Are in the Class**

Students should be alert and willing to participate in class activities and discussions and refrain from having disruptive conversations during class. Students must bring to the class: A copy of the textbook, a notebook for writing course notes, a calculator, all the relevant notes and handouts for the course, the needed stationery, and a copy of the syllabus. Textbooks are protected by copyright laws, and for this reason, the instructor will not allow any student to bring to the class illegal copies of the textbook. If students violate this they will be asked to leave the classroom and marked absent for the lecture.

Students are asked to limit the use of their laptop computers or tablets to class purposes. Those who violate this will not be allowed to bring to the class their laptops and tablets anymore and are not allowed to use their personal laptop computers and tablets during the class lecture. Students must switch off their smart/cell phones during the class lecture, quizzes, and tests. Anyone who does not respect this will be asked to leave the classroom and marked absent for that lecture.

Students are not allowed during the class lecture to study any other material beyond the course subject and will be asked to leave the classroom and marked absent for that lecture. Also, eating in the class is prohibited. All students need to put away newspapers, magazines or any other non-relevant items.

**Classroom Conduct**

Students are expected to behave in a collegial manner at all times when in class. Rude, disrespectful, aggressive, or threatening language or behavior will not be tolerated, and students displaying this will be removed from class. Distracting behavior will not be tolerated, and students behaving in this way will be asked to leave the class. Examples of distracting behavior include: Side

conversations while others are speaking; using a cell phone in any way; leaving during the middle of class; eating in class; using the computers for any purpose other that course material; any other behavior that a student is warned against during class.

### Grade Disputes

Unless grades are added up incorrectly, the grades will not change after exams and assignments are handed back to the students. If there is a dispute concerning the final grade for the course, students have the right to make a formal grade appeal within the period set by the Registrar Office. Details on this process can be found in the Academic Catalog.

### Incomplete Grades

In the unlikely event that it becomes necessary to assign an "I", for incomplete, as the final grade in the course, the affected student(s) and the instructor will adhere to the incomplete grade policy specified in the Academic Catalog.

### Revisions to the Syllabus

This syllabus is subject to change. It is the duty of the instructor to inform students of changes in a timely fashion. Students are obliged to be cognizant of any changes.

# Attendance

Every week there are three sessions of the course. The duration of each session is one hour. Students are expected to attend all scheduled classes, arrive on time, and remain in class until dismissed. Delayed arrivals and early departures are disruptive for the students as well as the teacher and are unacceptable. Students who leave the class will be marked absent for the lecture; no excuse will be accepted.

**As per university policy, at the eighth absence session the student will be dismissed from the course with a grade of F. These cutoffs are absolute. Per university policy, as stated in the Academic Catalog, there are no excused absences.**

Students will be warned after the seventh absence session that they will be dismissed from the course with a grade of F if they are absent one more session. Students may ask, outside the class time, to learn how many classes they missed.

### Expectations of Student Time

AUIS adheres to the United States federal definition of a credit hour, as established by the US Department of Education. As a three credit-hour course, you are expected to attend three hours of direct instruction per week, and spend a minimum of six hours out of class per week in homework, studying, preparing, and otherwise engaging with the material of this course.

### Academic Integrity

**Academic Integrity** is honest behavior in a school setting. Academic integrity is more than the absence of cheating. It is necessary for students to truly learn new skills and develop as human beings. By struggling with his/her own studies and by making honest mistakes and discoveries, a student learns about the world and himself/herself. Using another's work inappropriately prevents this intellectual and emotional growth.

**Academic Dishonesty** ("cheating") is any form of deceit, fraud, or misrepresentation in academic work. Academic dishonesty is the opposite of learning, because it prevents the student-writer from genuinely learning and responding to material. Plagiarism is one of the most serious forms of academic dishonesty.

**Plagiarism** is using other people's ideas and/or words without clearly acknowledging the source of the information. If a student uses content from the internet, a professional writer, or another student and does not inform the reader, he plagiarizes. A student who allows another student to use his writing without attribution is also guilty of plagiarism.

Cheating will not be tolerated. A student found to be cheating for the first time will receive a zero for the assignment, and the Dean of Students will be notified. In the event of a second offense confirmed by the Dean of Students, the student will fail the course. A third instance of cheating will result in that student being dismissed from the American University of Iraq, Sulaimani. Students are directed to the AUIS Honor Code and the Academic Integrity policy section of the Academic Catalog (available online on the AUIS website). These documents provide guidance in cases of academic dishonesty.

## Time Table

| Week | Dates | Topics | Book Sections | Assessment |
|---|---|---|---|---|
| 1 | Sep. 10 - 16 | Programming Paradigms | | |
| 2 | Sep. 17 - 23 | C/C++ Compiler and Development Environment | Stroustrup: Chapters 1 and 2 | |
| 3 | Sep. 24 - 30 | Procedural Programming, Basic Features of C/C++ | Stroustrup: Chapters 2, 9, and 12 | |
| 4 | Oct. 1 - 7 | Arithmetics and Computing, Address Datatypes | Stroustrup: Chapters 2 and 7 | |
| 5 | Oct. 8 - 14 | Programming Practice, Sorting Algorithms | Numerical Recipes: Chapter 8 | |
| 6 | Oct. 15 - 21 | Programming Practice, Project Group Formation | | |
| 7 | Oct. 22 - 28 | Engineering Applications | | **Term Exam I, Group Session** |
| 8 | Oct. 29 - Nov. 4 | Data Structures, I/O, Writing Project Proposals | Stroustrup: Chapters 4, 31, 32, and 33 | |
| 9 | Nov. 5 - 11 | Discussion and Revision of Project Proposals | | |
| 10 | Nov. 12 - 18 | Recapitulation, Examples: Data Structures, I/O | | |
| 11 | Nov. 19 - 25 | Project Work and Performance Measurements | | |
| 12 | Nov. 26 - Dec. 2 | Debugging, Documentation | | |
| 13 | Dec. 3 - 9 | Project Presentations | | **Term Exam II, Presentations** |
| 14 | Dec. 10 - 16 | Conclusion, Discussion of Ideas for Future Work | | |
| 15 | Dec. 17 - 23 | (Final Exam Week) | | |