

Course Syllabus

Course Information

Course number: CS 1336
Course title: Programming Fundamentals
Section number: 501
Credit hours: 3
Term: Spring 2011

Contact Information

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Course Pre-requisites

None.

Co-requisites

CS 1136 .110, listed instructor Feliks Kluźniak.
Please note that **enrollment in this particular section is mandatory**.
This is a laboratory course that is an integral part of the learning package.

Course Description

- 1) Understanding stored-program computers:
 - a) Binary arithmetic;
 - b) Basic (traditional) architecture:
 - i) CPU and memory;
 - ii) Registers:
 - (1) hidden registers;
 - (2) programmable registers;
 - (3) the instruction counter;
 - c) Principles of operation;
 - d) Fundamentals of programming:
 - i) Stored programs, automodification;
 - ii) Control flow;
 - iii) Assembly language;
 - iv) Non-recursive subroutines.
- 2) The basic notions of imperative programming languages:
 - a) Elementary understanding of formal syntax;
 - b) Variables and assignment;
 - c) Types;
 - d) Expressions;
 - e) Fundamental control structures:
 - i) Sequential composition;
 - ii) The conditional statement;
 - iii) The iterative statements;
 - iv) Procedures and functions;
 - v) Recursion;
 - f) Fundamental data structures:
 - i) Arrays;
 - ii) Records (“structs”);
 - iii) Using pointers to construct:
 - (1) binary trees;
 - (2) linked lists.
- 3) Basic ability to reason about programs, with stress on using the ability while the program is being written. In particular:
 - a) Formulating the invariant and the argument for termination as a necessary prerequisite in developing a loop;
 - b) Formulating and verifying the necessary preconditions for the applicability of a subroutine (procedure or function).
- 4) Basic understanding of compilers and interpreters, compile-time and run-time (just on a conceptual level: this course is not about compilers).
- 5) Basic ability to reason about computational complexity. In particular:
 - a) Appreciating the importance of the computational complexity of an algorithm and the relative lack of importance of small-scale improvements in efficiency.
- 6) Elementary notions of object-oriented programming, expressed in terms of more general notions:
 - a) Inheritance and polymorphism as applied to records;
 - b) The method as a procedure that is the field of a record;
 - c) Virtual methods as a safer alternative to type tests;
 - d) The close parallel between classes vs. objects and record type declarations vs. records.

- 7) A brief introduction to Java. (The programming language used in this course is not Java, but a Pascal-like language called TL.)

In group 2 (the basic notions of imperative languages) advantage is taken of the students' knowledge of group 1 (understanding stored-program computers) to develop their intuitions about how programming language constructs map to the underlying machine (the "runtime model").

Group 3 (basic ability to reason about programs) is taught and practiced concurrently with group 2 (the basic notions of imperative languages).

The course takes a two-pronged approach: performing practical exercises (studying and writing many short programs) is as important as learning new concepts. True understanding can be achieved only through applying the concepts in practice: hence the mandatory accompanying lab (CS 1136.110 TBD).

Student Learning Objectives/Outcomes

As a result of attending the course the students should acquire an internalized understanding of the fundamental principles of imperative programming.

After successfully completing the course they should be ready to master new programming languages (more or less on their own), appreciate more advanced programming concepts (e.g., proper modularization), deepen their knowledge about and experience with data structures, more complex algorithms etc.

In particular, the students should achieve the following abilities:

- to effectively use fundamental constructs of imperative programming: assignment, loops, conditional statements;
- to write simple programs that process data in arrays and other simple data structures;
- to develop and use simple functions and procedures;
- to express simple algorithms, in particular for searching and sorting arrays;
- to program simple sequential input and output.

Required Textbooks and Materials

Materials will be distributed during the course. PowerPoint slides from each lecture will be made available on-line after the lecture. There is no textbook.

Assignments & Academic Calendar

The grades will be based primarily on the results of the examinations. There will be a mid-term exam, which will account for 1/3 of the points, and a final exam, which will account for 2/3 of the points.

These will be “open book” examinations. A student can have and make use of any printed material (e.g., class handouts, copies of slides from lectures, printouts of programs, books), as well as handwritten notes. The handwritten notes (as well as any handwritten annotations on the printed materials) must be in the student’s own hand. Use of any electronic equipment is not allowed.

(All exceptions to these rules require a special permission from the instructor, to be obtained by the concerned individual at some earlier date.).

There will also be three graded homework assignments. The exact dates will be announced during the course. The primary purpose of these assignments is to provide feedback to the students about how well they understand the material (and are thus prepared for the examinations).

There will also be a number of unannounced quizzes during the lectures.

Grading Policy

The grade scale for this course is A+, A, B, C, D, F.

F is the failing grade. Please note that at least a C from this course is required as a prerequisite for CS 1335 and CS 1337.

A student who has submitted at least two homework assignments that were graded A+, A or B will have her or his examination grade raised by one point on the scale, **except** when the original grade from the examinations is a failing grade.

A student who received A+, A or B from at least 70% of the in-class quizzes will also have her or his examination grade raised by one point on the scale, **except** when the original grade from the examinations is a failing grade.

The improvements in grade due to homework assignments and quizzes are cumulative. For example, an examination grade of D may sometimes result in a final grade of B.

A student who has received a failing grade for at least 60% of the in-class quizzes will have her or his examination grade lowered by one point on the scale. Failure to hand in the results of a quiz results in a failing grade for that quiz. A student who has **missed four or more classes** will also have her or his grade lowered by one point on the scale. The downgradings are cumulative.

The instructor reserves the right to modify these rules at his own discretion, but only in favour of the students. (For example, the rule about failed quizzes may be relaxed because of a student’s illness.)

Course & Instructor Policies

Use of any electronic equipment in class is not allowed, unless the instructor gives his permission.

Any student who has difficulty understanding a particular point is expected to interrupt the instructor with a question (albeit in an orderly manner).

Students are expected to review the course material from previous lectures, so that they come to class well-prepared to absorb the new material. (The course material is posted on the instructor's university web page: www.utdallas.edu/~feliks.kluzniak.)

Students are encouraged to discuss their difficulties and other matters related to the course with the instructor (during his office hours or by special appointment).

Field Trip Policies / Off-campus Instruction and Course Activities

None.

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:
The University of Texas at Dallas, SU 22
PO Box 830688
Richardson, Texas 75083-0688
(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

These descriptions and timelines are subject to change at the discretion of the Professor.