CS 3723/3721: PROGRAMMING LANGUAGES
SPRING 2010, COURSE SYLLABUS

Course Description
An introduction to high-level procedural, functional, and object-oriented languages, their theoretical foundations, organization, and implementation. Topics include formal syntax, compilers and interpreters, types systems, scoping and activation records, control structures, and data abstraction.

Schedule
CS 3723: Mon./Wed./Fri. 10:00-10:50pm in HSS 2.02.20
CS 3721: Wed. 11:00-11:50am in SB 3.02.10A

Instructor
Instructor: Dr. Jeffery von Ronne
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Office Location: S.B. 4.01.14
Office Hours: Tues. 11-11:50am, Fri. 11-11:50pm, and by appointment

Textbook
The primary text book for this course will be John Mitchell’s Concepts in Programming.

The majority of project work for this course will be done using Scala. In addition to the online resources, Martin Odersky, Lex Spoon, and Bill Venners’s book Programming in Scala: A Comprehensive Step-by-step Guide is highly recommended.

If you really want to get functional programming, I highly recommend that you purchase a copy of Daniel Friedman and Matthias Felleisen’s Little Scheme and spend some time working through the material there one chapter at a time (one per day or one per week).

Links to additional tutorial and reference material for the other languages discussed in the class will be provided as needed. These will be posted to the newsgroup and/or class web site: http://www.cs.utsa.edu/~vonronne/classes/cs3723-s10/.

Course Outline
Planned Topics by Week:
1. Introduction, Scala, Computability
2. Compilers/Interpreters, BNF
3. Lisp, Lambda Calculus
4. Denotational Semantics
5. Programming Paradigms (procedural, FP, OO, LP)
6. Algol Family, ML
7. Type Systems, Types in ML and Scala
8. Scopes and Functions
9. Control Structures
10. Data Abstraction and Modularity
11. Object-Oriented Programming
12. Dynamic Extensibility
13. Simula and SmallTalk
14. C++ and Java
15. Concurrency

**Grading**

Final grades will be assigned using the weighted average of the following components:

- Participation 10%
- Homework 10%
- Projects 20%
- First Exam 20%
- Second Exam 20%
- Final Exam 20%

A total score of 90% will earn an ‘A,’ a total score of 80% will earn at least a ‘B,’ a total score of 70% will earn at least a ‘C,’ and a total score of 60% will earn at least a ‘D’. The instructor reserves the right, however, to lower the thresholds if the instructor determines that to be appropriate in order to calibrate the grading to the learning objectives and course difficulty.

There will be a single grade assigned for both CS 3721 and CS 3723.

**Attendance and Participation**

To receive full participation points, students must attend lecture and recitation regularly, be prepared for class (including completing assigned readings in advanced), and participate in class discussions (by asking questions, answering questions, and presenting assigned material).

Students will be considered to attend classes regularly if their absences do not exceed 1/5 of the class meetings. Students will not be penalized for absences due to participation in university sanctioned activities. The instructor will not otherwise differentiate between unexcused and excused absences.
Prerequisites

Students are assumed to already be familiar with Java and C, basic data structures, and mathematical induction and other discrete mathematics topics. They should have this background if they have completed the prerequisites of:

1. CS 2123 and 2121: Data Structures
2. CS 2213 and 2211: Advanced Programming
3. CS 2233 and 2231: Discrete Mathematical Structures

Concurrent enrollment in both CS 3721 and CS 3723 is required.

Course Goals

As a result of taking this course, students should:

1. better understand the historical development of programming languages,
2. have the conceptual framework to better understand new programming languages,
3. understand of how programs are implemented and how this effects the performance and behavior of both programs and development tools,
4. understand how the programming languages we are familiar with influence our approach to programming problems,
5. increase their repertoire of problem solving strategies,
6. have an intermediate level of proficiency in Scala and familiarity with Lisp/Scheme, ML, and C++, and
7. have a basic proficiency for programing in a functional style.

Important Dates

The time and place of final examinations for organized courses are given in the University’s Final Examination Schedule. The schedule is to be followed as announced, with final examinations given on the dates and at the times when they are scheduled and in the places where they are scheduled. The final exam for CS 3723 in Spring 2010 is scheduled for 7:30am on Wednesday, May 5, 2010.

Two in-class exams will be held during the semester, these are scheduled for February 15, 2010, and March 29, 2010.

For Spring Semester 2010, for undergraduates with fewer than 30 hours, the Drop Date is Monday, April 26th. For all other students, the Drop Date is Monday, March 22nd.

Late Assignments and Projects

Late work will generally be accepted for grading with a 20% penalty if it is received by the instructor / TA within 48 hours of the due date. Work submitted more than 48 hours late will not normally be accepted.
Makeup Examinations and Incompletes

Makeup examinations and incompletes will only be considered by the instructor if there are serious extenuating circumstances (such as hospitalization or death of an immediate family member) that are beyond control of the student. Such circumstances need to be documented and discussed with the instructor as early as possible.

Scholastic Dishonesty

Generally, in this course, students will be allowed to collaborate in small groups on assignments and projects as long as they acknowledge with whom they have worked or from whom they've received help on each assignment/project. The specific instructions for any particular assignment, however, takes precedence over this general prescription. In any case, it is not acceptable to simply copy solutions from any source (e.g., other students, web pages), or paraphrase such solutions without acknowledging the source from which the solution came.

The Office of Student Judicial Affairs or faculty may initiate disciplinary proceedings against any student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, and any act designed to give unfair advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor, providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment), or the attempt to commit such an act.

Please refer to Student Code of Conduct in the Information Bulletin (http://www.utsa.edu/infoguide/appendices/b.html) for more information on student responsibilities and potential penalties for violations.

Disability Services

Academic accommodations are services that provide equal educational opportunities for students with disabilities. They are provided on an individual basis and determined by documented need. Students with disabilities who wish to request services or accommodations at UTSA should first consult with Disability Services to determine what accommodations are appropriate. After the appropriate accommodations are determined, students contact the instructor as soon as possible to make any necessary arrangements.

For more information, please refer to:
http://www.utsa.edu/disability/students.htm

Quality Enhancement Plan (QEP)

The Quality Enhancement Plan (QEP) is a course of action designed to enhance student learning and is a required component of the accreditation process conducted by the Southern Association of Colleges and Schools (SACS).
The UTSA QEP *Quantitative Scholarship: From Literacy to Mastery* provides you with the skills needed to evaluate and interpret data, understanding risks and benefits, and make informed decisions in your personal and professional lives. The plan focuses on integrating quantitative reasoning and communication skills in *existing* courses across the undergraduate curriculum.

The SACS team will visit UTSA during March 23–25, 2010 to review the reaccreditation plan. All UTSA students, faculty, and staff are encouraged to learn more about the QEP by visiting the website www.utsa.edu/qep.

**Notice of Contingency**

This syllabus is provided for informational purposes regarded the anticipated course content and schedule of this course. It is based upon the most recent information available on the date of its issuance and is as accurate and complete as possible. The instructor reserves the right to make any changes he deems necessary and/or appropriate. The instructor will makes his best efforts to communicate any changes in the syllabus in a timely manner. Students are responsible for being aware of these changes.