Syllabus

CIS 706: Translator Design I, Spring 2015

Purpose
The course will teach modern compiler techniques applied to general-purpose programming language. The goal of the course is to give students a working knowledge of the foundations, tools, and engineering approaches used in developing formal language translators. The emphasis is on the construction of compilers to position students to build translators for little languages in their careers.

Course Topics
Compilers and interpreters, including description of languages, finite state scanners, parsing, symbol tables, syntax directed semantics, code generation, and static analysis.

Philosophy
This course is based on a course that was originally designed by Laurie J. Hendren (http://www.sable.mcgill.ca/~hendren) and Michael I. Schwartzbach (http://www.brics.dk/~mis) which has been taught at a number of universities over the past decade. The course received a significant update by Robby (http://people.cis.ksu.edu/~robb) and Matthew B. Dwyer (http://cse.unl.edu/~dwyer/) in 2005 with respect to the projects and the tools that are used for compiler implementation; this update achieves a modernization of compiler construction technologies. This is primarily an introductory compiling course that has been designed to recognize that most people will not build a large application like a compiler from scratch and that people learn by doing. Towards this end, the project for the course involves the enhancement of an existing compiler code base. Students will be given a working compiler and will be required to extend it in significant ways. This will give them insights into how a compiler is designed and written that they can leverage for their enhancements. While serving this purpose, the course does present significantly more content on static analysis than is typically found in an introductory compiling course; thus it can serve as an effective introduction on advanced topics for graduate students.

Books
- Principles of Program Analysis (http://www2.imm.dtu.dk/~riis/PPA/ppa.html), by Flemming Nielson, Hanne Riis Nielson, and Chris Hankin (recommended)
- Design Patterns: Elements of Reusable Object-Oriented Software (http://www.informit.com/store/design-patterns-elements-of-reusable-object-oriented-9780201633610), by Erich Gamma, Richard Helm, Ralph Johnson, John M. Vlissides (recommended)

Schedule
- Time: T U, 1:00-2:15pm
- Place: 236 Nichols Hall

Prerequisites
- CIS 505: Introduction to Programming Languages (http://courses.k-state.edu/catalog/undergraduate/en/cis.html#CIS505)
- Java and C programming skills

Credits
- 3 credits

Instructor
Robby (http://people.cis.ksu.edu/~robb), Office: 324B Nichols Hall, E-mail: robby @ ksu.edu, Office Hours: After lab or by email appointment (see online calendar (http://people.cis.ksu.edu/~robb/calendar.html))

Graduate Teaching Assistant
Hariharan Thiagarajan, Office: 324 Nichols Hall, E-mail: thari @ ksu.edu Office Hours: F 3-4pm or by email appointment

Grading
- Solo Project (30%)
- Quizzes (15%)

http://compilers.santoslab.org/syllabus.html#syllabus
Grading Policy
The course Schedule (schedule.html#schedule) page gives the due dates for all of the homework. This is to facilitate your planning and time-management. Given this, we expect assignments to be turned in on the due date unless prior arrangements have been made; late assignments receive a reduction of 1% of the total possible points for each hour after the due date/time.

Grading Scale
Course grades are absolute, that is, there is no curve, and will be calculated based on your overall percentage on assignments as follows:

- A: 90% – 100%
- B: 80% – 89%
- C: 70% – 79%
- D: 60% – 69%
- F: below 60%

There is one additional constraint on your final grade. To receive a letter grade of A, you must achieve at least a B on the exam. Similarly, to receive a B you must achieve a C, C you must achieve a D on the exam.

Computer Access
This course involves a lot of programming, and it makes significant use of software tools. Many of these can be accessed by you (for free) and installed on your own machine. If you prefer, we have everything you need on our CIS department machines so you can get an account on our machines. See the Notes (notes.html#notes) page for information on how to get an account and use our machines.

Attendance Policy
In general, there will be NO make-up quizzes or exams! Special consideration will be given in only exceptional circumstances. Exceptional circumstances are generally limited to:

- **Emergencies:** death in student’s immediate family, or near-death experience of the student.
- **Non-emergencies:** certified excused absences for official university activities.

If you believe you qualify for exceptional treatment, you must notify the instructor prior to the date of the quiz or exam to be missed.

Statement Regarding Academic Honesty
Kansas State University has an Honor System based on personal integrity, which is presumed to be sufficient assurance in academic matters one’s work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system website can be reach via the following URL: http://www.ksu.edu/honor (http://www.ksu.edu/honor).

A component vital to the Honor System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: “On my honor, as a student, I have neither given nor received unauthorized aid on this academic work.” A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

Other Administrative Issues

- **Incompleteness:** An incomplete (I) final grade will be given only by prior arrangement in exceptional circumstances conforming to departmental policy in which the bulk of course work has been completed in passing fashion.
- **Drop Policy:** It is your responsibility to drop the course if you are enrolled but decide not to complete the course — there are no “automatic” drops due to nonattendance. The University allows a retake of a course with removal of the prior grade, at most once per course, for a maximum of five courses.
- **Students with Disabilities:** If you have any physical or learning disability which will make it difficult for you to carry out the work as I have outlined in this syllabus or which will require academic accommodations, please notify me the first two weeks of the course.
- **Harrasment:** One purpose of your education is to help you develop skills, approaches, and abilities that are necessary for effective teamwork, and for your success in your profession and as a citizen. It is important that you understand your rights and responsibilities regarding the University’s Sexual and Racial Harassment policies (full text of the policies can be found on KSU’s web site at http://www.ksu.edu/uauc/fhbook/fhj.html (http://www.ksu.edu/uauc/fhbook/fhj.html)). If you experience any situations, in or out of class, that seem inappropriate or that make you uncomfortable, a list of resources and courses of action to assist you can be found on the College of Engineering web site at http://www.engg.ksu.edu/harassment-statement (http://www.engg.ksu.edu/harassment-statement).
- **Expectations for Classroom Conduct:** All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Government Association By Laws, Article VI, Section 3, number 2. Students that engage in behavior that disrupts the learning environment may be asked to leave the class.
- **Campus Safety:** Kansas State University is committed to providing a safe teaching and learning environment for student and faculty members. In order to enhance your safety in the unlikely case of a campus emergency make sure that you know where and how to quickly exit your classroom and how to follow any emergency directives. To view additional campus emergency information go to the University’s main page, http://www.k-state.edu (http://www.k-state.edu), and click on the Emergency Information button.
- **Copyright Issues:** Class and lecture notes for this course carry a copyright. Students are prohibited from selling (or being paid for taking) notes during this course to or by any person or commercial firm without the express written permission of the professor teaching this course.
For a more complete discussion of these issues see the course policies for the College of Engineering at Kansas State University: