60-100 KEY CONCEPTS IN COMPUTER SCIENCE
School of Computer Science, University of Windsor

Instructor

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 Course website   http://richard.myweb.cs.uwindsor.ca/60_100/60_100_welcome.html

Office Hours – Room 8109: 4:00pm to 6:00pm Tuesdays.

Purpose of the course and learning resources

Course outline

The objectives of this course are to excite students' interest in Computer Science and to give students a precise understanding of a number of difficult concepts that are fundamental to modern Computer Science. Topics include: basic programming constructs, relational algebra, data types, recursion, proof by induction, syntax, semantics, computational complexity, formal logic, soundness, completeness, and decidability.

Lectures and tutorials

Students will have the opportunity to meet with the instructor, with other students, and with teaching assistants through the following:

- Formal lectures every week – see next page for times and location
- One one-and-a-half hour laboratory/tutorial session per week – see your university schedule/SIS for location/times for your section.
- One-to-one consultations with teaching assistants and the instructor as required.
- Discussion and interaction with other students through the Internet.

Course notes and web page

Course notes are available from the bookstore for approximately $35 or less (the cost of printing). There is no textbook for this course.

The web page for 60-100 contains lecture slides, assignments, important notices, etc. and is accessible at:

  http://richard.myweb.cs.uwindsor.ca/60_100/60_100_welcome.html

Computing resources
The following computing resources will be available for students taking this course:

- A distributed-computing network, accessible through a graphic interface provided by Ubuntu (Linux) terminals located in various labs (see later). Also, you can access the network from home – we will show you how.
- State-of-the-art parallel-processing Sun Linux compute servers.

- A "functional" programming language called Miranda (see later for more information).

Access to Computing Resources

The computing network can be accessed through Ubuntu terminals in the Java-lab (The Commons) and the X-lab on the 3rd floor of Erie Hall (open from 9am to 10 pm weekdays), and through PCs in an open laboratory in the Computer Centre, or, for students who have the necessary equipment, from home via the Internet. We will show you how to do this at the beginning of the course. Students who have difficulties with the network, or who have questions concerning access from home, etc., should first of all contact the Computing Consultants in IT Services, and if they are still in need of advice, should contact the student teaching assistants for this course, whose names and email addresses will be handed out in class.

Teaching assistance provided

- The professor will give lectures and will directly supervise the marking of all tests and exams. The instructor will also be available for consultation after students have first met with teaching assistants and/or lab instructors.
- A number of undergraduate and graduate teaching assistants will be available for several hours each week for one-to-one consultation at times and places that will be announced on the course website.
- The professor, or a lab instructor, together with a number of teaching assistants will supervise the laboratories/tutorials and mark the group assignments.

Work to be undertaken by students

Preparation for lectures

Attendance at all lectures and tutorials is highly recommended. Some of the concepts covered are difficult and the professor will attempt to present the concepts in such a way as to make them easier to understand. Students should **read the course notes ahead of lectures.** A detailed schedule showing the topic of each lecture is given at the end of this outline. Lectures are not substitutes for student reading. **Students who do not read ahead may find themselves lost in the lectures.**

Individual Assignments

Students should attempt to complete individual assignments by the suggested completion dates. This will help in preparation for the material to be covered in the subsequent lecture.   Answers for individual assignments will be made available so that students can revise concepts that were misunderstood, and assess their own progress.

Self-study of the programming language

The concepts covered in this course have direct relevance to the development of software in any programming language. However, we have found that students can understand these concepts better and more quickly if they experiment with them directly in a high-level declarative programming language. We have chosen the pure functional programming language "Miranda" for this task. Miranda is a declarative language and is ideally suited for coding prototypes of algorithms. Programs are typically 5 to 10 times shorter than those written in procedural or object-oriented languages such as C, C++, or Java. Miranda is available on the distributed-computing network and comes with an online manual, introductory notes, and examples. The Miranda environment can be invoked by typing "mira" at the Unix command prompt. Students will be shown how to use the Unix environment and run Miranda programs in the first and

second weeks of class. It is important that students login to the computing systems early in the courses and begin experimenting with Miranda. (More info. on the course website).

Students must register in a laboratory section and MUST attend the CORRECT laboratory section if they want to earn marks for group assignments.

Attendance at the laboratory/tutorials is very important in order to gain an understanding of some of the more difficult concepts.

Students will be assigned to groups of 4 or 5 students in the first laboratory. Group assignments will be handed out each week. Your answer should include a clear statement of who was present at the laboratory session. Two group leaders will be assigned to each group each week. It is the responsibility of the group leaders to write up the groups' answer to the assignment for that week, including the names of the group members present.

Revision for test and exams

To facilitate revision for tests and exams, copies of past tests and exams are provided at the end of the course notes. The tests and exams for this offering of the course will have the same format as the tests and exams used from 1997 to 2000, and from 2005 to 2014 (copies of which can be found at the end of the course notes). There will be no surprises on the tests or final exam.

Teaching Evaluation

Student Evaluation of Teaching (SET) forms will be administered during the last two weeks of the class schedule.

Weekly Work Schedule

In order to keep up with the work required for this course it is a good idea for students to write down a weekly schedule, such as the following, filling in the time and location column according to which sections you are in and when you can schedule reading time, etc.

Task	Duration	Time	Location
Reading of lecture notes	1 hour		
Lectures	1 hour 20 mins each	Tuesday 2:30 to 3:50 pm and Thursday 2:30 to 3:50 pm	OB 104
Individual assignment	1.5 hours	Submitted before Tuesday at 2:30pm	
Lab./Tutorial	1.5 hours	Thursday (see your registration) or Friday (see your registration	Erie 2125
Additional optional tutorial (when available)	1 hour		
Self-study of Miranda	1 hour		
Weekly TOTAL (excluding revision for tests and exam)	8 to 9 hours		

A note: No student will be allowed to take any course at the University more than two times without permission from the Dean. It is important, therefore, to work hard to ensure success at the first attempt at any course.

Evaluation Scheme

Assessment of students taking 60-100 consists of various components. They will be weighted as follows in the calculation of the final mark. Note that class tests are held on Saturdays. The location of the final exam will be announced later.

Group assignments in labs.	10% (marked by the professor or assistant supervising the lab)		
Individual assignments	10%		
Class Test #1	20 %	Saturday 26th September 12:00 pm – 2:00 pm Room TBA	
Class Test #2	20 %	Saturday 14th November 12:00 pm – 2:00 pm 202 Tolodo	
Final Exam	40%	Thursday 10th December 12:00 pm – 3:00 pm Room TBA	

Students who wish to appeal a class-test, exam, or assignment mark should wait until they have received their final mark at the end of the semester and then follow the procedure outlined in the University Calendar for the appeal of that mark. No remarking of class tests or the final exam will be undertaken unless a formal grade appeal is submitted at the end of the semester after the student has received the final mark for the course. Numerical errors in adding marks on class tests and the final exam will be corrected as soon as they are identified identified.

Missed assignments, tests or final exam

There will be approximately 10 individual assignments. Students are allowed to miss one assignment without penalty. Late assignments will be accepted if students provide a valid reason BEFORE the due date.

There will be approximately 10 group assignments which students complete in groups at the scheduled laboratories on Thursdays or Fridays. Students are allowed to miss one assignment without penalty. Students will be allowed to miss other group assignments if a valid reason is given BEFORE the laboratory.

Students who miss a class test or final exam, for a valid reason which is given to the course instructor BEFORE the class or exam date, will be allowed to take a makeup test or exam at a time that is mutually convenient for the student and the instructor.

A valid reason includes illness of the student (confirmed by a doctor's note), or severe illness of an immediate family member, that is confirmed by a doctor's note, a pre-arranged absence which cannot be avoided, e.g. representing the university at a sporting event (supported by written evidence).

Policy on cheating

The professor and teaching assistants for 60-100 will put a great deal of effort into helping students to understand and to learn the material in the course. However, they will not tolerate any form of cheating.

The professor and teaching assistants will report any suspicion of cheating to the Director of the School of Computer Science. If sufficient evidence is available, the Director will begin a formal process according to the University Senate Bylaws. The professor will not negotiate with students who are accused of cheating but will pass all information to the Director of the School of Computer Science.

The following behavior will be regarded as cheating (in addition to other acts that would normally be regarded as cheating in the broad sense of the term):

- Copying assignments

- Allowing another student to copy an assignment from you and present it as their own work

- Copying from another student during a test or exam

- Referring to notes, textbooks, etc. during a test or exam

- Talking during a test or an exam

- Not sitting at the pre-assigned seat during a test or exam

- Communicating with another student in any way during a test or exam

- Having access to the exam/test paper prior to the exam/test

- Asking a teaching assistant for the answer to a question during an exam/test

- Refusing to obey the instructions of the officer in charge of an examination.

- Presenting another student's work as your own

- Modifying answers after they have been marked

- Any other behavior which attempts unfairly to give you an advantage over other students in the work-assessment process

Lecture Schedule (2014)

Lectures and Week	Lecture Topic
(Intro and Lecture 1 & part of 2) Tuesday 8th September	Introduction to the course. Using the distributed-computing network. **Students must activate their user accounts this week**– see assignment #1.
(Lecture rest of 2 and 3) Thursday 10th Sept.	Programming: Chapter 2 of notes, pages 3-8.
(Lectures 4 & 5) Week starting 14th Sept.	Programming: rest of Chapter 2 of notes, plus first 4 sides of "An Overview of Miranda" in notes after page 8. List comprehensions.
(Lectures 6 & 7) Week starting 21st Sept.	Knowledge Representation: Data, set theory, relations and functions. Chapter 3 of notes, pages 9 to 15 and revision for class test#1.
SATURDAY 26th Sept.	TEST#1 12 noon to 2:00pm – location Room TBA.
(Lectures 8 & 9) Week starting 28th Sept..	Data types (lecture 8), operations on data, and relational databases: Chapter 4, pages 16 to 31.
(Lectures 10 & 11) Week starting 5th Oct.	Function definition and recursion: Chapter 5 in notes, pages 32 to 38 plus the next non-numbered page.
Week starting 12th Oct.	STUDY WEEK
(Lectures 12&13) Week starting 19th Oct.	Languages: Chapter 6 in notes, and syntax of languages: Chapter 7 in notes.
(Lectures 14 & 15) Week starting 26th Oct.	Semantics of languages: Chapter 8 in notes, pages 52 to 57.
(Lectures 16 & 17) Week starting 2nd Nov.	Revision for class test#2 &induction Chapter 10 of notes, pages 59 to 69 plus next 2 non-numbered pages.
NOTE 16th Nov. is the last day for voluntary withdrawal	
(Lectures 18 & 19) Week starting 9th Nov.	Induction: & revision for class test #2
SATURDAY 14th Nov.	TEST#2 12 noon to 2:00pm – location Room 202 Toldo
(Lectures 19 and extra induction lecture) Week starting 16th Nov.	Induction
(Lectures 20 & 21) Week starting 23rd Nov.	Complexity: Chapter 12 of notes, 3 non-numbered pages before page 72.
(Lecture 22) Week starting 30th Nov.	Logic & Revision for final exam.
THURSDAY 10th December	FINAL EXAM: 12pm to 3pm – location to be announced.