FACULTY OF COMPUTER SCIENCE

CS3933 Course Outline
Winter 2007

Professor: Patricia Evans
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Course Webpage: http://www.cs.unb.ca/profs/pevans/cs3933/

Objectives:
This course focuses on the design and analysis of algorithms. A variety of different algorithm design techniques will be explored, and example problems and algorithms will be worked through in class. Algorithms' running times will be analyzed using asymptotic analysis (big-O and its relatives) and compared. Techniques for proving that problems are equivalently difficult to solve will also be addressed, introducing students to NP-Complete problems and some methods for dealing with them.

By the end of the course, students should be able to analyze the time complexity of algorithms, explore computational problems, recognize common problems, adapt existing algorithms for new related uses, design algorithms to solve new problems, and assess the difficulty of solving problems.

Prerequisites: CS 3323 and (CS 2303 or CS2333)

Textbook (required): *Algorithm Design*, by John Kleinberg and Éva Tardos.

Evaluation:

Assignments (Solo):	20%
Assignments (Group):	10%
Midterm:	20%
Final Exam:	50%

All tests and exams will be closed book, and no calculators or other aids will be permitted. The midterm is scheduled for Monday February 19, unless subsequently changed.

Some material presented in class will not be in the textbook. All presented or assigned material is testable.

Assignments:
Assignments are divided into 2 types: Solo and Group. There will be approximately 5 assignments of each type. All Solo assignments must be done individually by each student. All Group assignments may be done in groups of up to 3 people. Each group is to submit one copy of their solutions with the names of all group members at the top. Groups are to be determined by the students and can be different for different Group assignments. All group members are expected to participate in working out the group solutions.

Assignment questions will be posted on the course web page. Assignment questions (aside from any implementations) may be either word processed or handwritten neatly. Points may be deducted if your work is sloppy or difficult to understand. Implementation questions may be completed in either Java or C, and what is to be handed in for implementations will be stated in the assignment question.

Hand in all assignments in the CS3933 bin for your section on E level of Gillin Hall. **Late assignments will not be accepted.**

All assignments should include a header or title page with the following information:
Name, Student Number, Course Number, Assignment Number
Questions must be appropriately labeled and must be submitted in the order assigned.

All students are expected to hand in only their own individual work for Solo assignments. For Group assignments, each group must hand in only the work of its own group members. All students are expected to be familiar with UNB Regulations, and in particular are expected to be familiar with the regulations on plagiarism and other academic offences given in the UNB Calendar (Section B, part VII). Academic offences will be dealt with severely.

Course Topics and Approximate Schedule:

- Basic Algorithm Analysis and Comparison (Week 1-2)
- Divide-and-Conquer Algorithms (Week 2-3)
- Graphs (Week 3-4)
- Greedy Algorithms (Week 5-7)
- Dynamic Programming Algorithms (Weeks 7-9)
- Problem Reductions, NP, and Computational Intractability (Weeks 10-12)

A. PLAGIARISM (from the 2006-2007 Undergraduate Calendar, Section B, part VII, pages 43-44)

Plagiarism includes:

1. quoting verbatim or almost verbatim from a source (such as copyrighted material, notes, letters, business entries, computer materials, etc.) without acknowledgment;
2. adopting someone else's line of thought, argument, arrangement, or supporting evidence (such as, for example, statistics, bibliographies, etc.) without indicating such dependence;
3. submitting someone else's work, in whatever form (film, workbook, artwork, computer materials, etc.) without acknowledgment;
4. knowingly representing as one's own work any idea of another.

NOTE: In courses which include group work, the instructor must define and warn against plagiarism in group work. Unless an act of plagiarism is identified clearly with an individual student or students, a penalty may be imposed on all members of the group.

Penalties for Deliberate Plagiarism

In a case of deliberate plagiarism, the penalties are:

First Offence: If the student does not appeal, or if, on appeal, the Committee upholds the instructor's decision:

1. A notation will be placed on the student's transcript of academic record concerning the academic offence. The length of time the notation appears on the student's transcript of academic record is to be decided when the penalty is imposed and will depend on the severity of the offence.
2. The student may be required to submit a satisfactory and genuine piece of work to replace the one involving plagiarism. If the assignment is not resubmitted or is unsatisfactory, the student will receive a grade of F (zero) in the course. Note: If this penalty is assessed, the period of time allowed for the submission of the work will be determined by the Registrar in consultation with the faculty member making the charge, and, where appropriate, the Committee.
3. The student will receive a grade of F (zero) on the piece of work and, depending on the severity of the offence, may receive a grade of F for the course.
4. Other penalties as outlined in penalties for Other Academic Offences may be imposed.

Subsequent Offence: In cases where the Committee considers that the student has plagiarized again:

1. the student will receive a grade of F in the course and a notation of the academic offence will appear on the student's transcript of record. The length of time the notation appears on the student's transcript of academic record is to be decided when the penalty is imposed.
2. Other penalties as outlined in penalties for Other Academic Offences may be imposed.

For further information on procedures for dealing with cases of plagiarism, students should refer to the regulations found on pages 43-45 of the 2006-2007 Undergraduate Calendar.

B. OTHER ACADEMIC OFFENCES

1. Cheating on examinations, tests, assignments or reports.
2. Impersonating a candidate at an examination or test or in connection with any assignment in a course or availing oneself of the results of impersonation.
3. Obtaining, through theft, bribery, collusion, purchase or other improper manner,
    1. an examination or test paper prior to the date and time for writing the examination or test;
    2. academic materials belonging to another person, e.g. laboratory reports, assignments, papers, computer materials, datasets.

4. Falsifying or knowingly submitting false assignments or credentials, records, transcripts, or other academic documents.

5. Submitting a false health or other certificate.

6. Submitting identical or substantially similar work for one course or program of study, which has been or is being submitted for another course or program of study, without the prior express knowledge and approval of the instructors.

7. Interfering with the right of other students to pursue their studies.

8. Knowingly aiding or abetting any of the above offences.

9. Tampering with, or altering, in any deceptive way, work subsequently presented for a review of the grade awarded.