

## ENGINEERING 5895: Software Design

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<b>Office Hours</b>	Weds 11:00—11:50. Thurs 12:00—13:00
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**PREFERRED METHOD OF CONTACT:** Via email at my MUN email address, theo at mun dot ca. Unless otherwise arranged, please send only from your @mun.ca account.

### CALENDAR ENTRY:

**ENGI 5895 Software Design** examines the development process: requirements analysis, design, iterative development, design documentation; an introduction to the Unified Modelling Language: use cases, class diagrams and sequence diagrams; an introduction to software design patterns: creational patterns, structural patterns and behavioral patterns; object oriented, modular decomposition. The course includes a major design project.

**LC:** at least 25 lecture hours per semester

**LH:** at least four 3-hour sessions per semester

**OR:** meetings with project supervisor as required

**PR:** ENGI 4892

**Credit Value:** 3 Credits

### COURSE DESCRIPTION:

In this course, students will combine technical mastery with creativity to create complete software applications. In it the student will learn about software design at the requirements, architectural, pattern, class and levels.

### SCHEDULE:

Class: Mondays, Wednesdays, and Fridays 12:00—12:50 in EN-1004.

Labs: Thursdays 9:00—11:50 in EN-1038B or EN-4035.

### RESOURCES:

#### Textbook:

Robert C. Martin, *Agile Software Development, Principles, Patterns, and Practices*, Prentice

Hall, 2002.

**Reference:**

- If you don't know Java really well, you should buy a decent book on Java. I recommend Cay S. Horstmann and Gary Cornell, *Core Java Volume I—Fundamentals, 9th edition*, Prentice Hall, 2012. 7th and 8th editions are fine too.
- If you don't know UML really well, you should buy a decent guide to UML. I recommend either Martin Fowler, *UML Distilled: A Brief Guide to the Standard Object Modeling Language*, 3rd edition, Addison-Wesley Professional, 2003 or Grady Booch, James Rumbaugh, and Ivar Jacobson, *The Unified Modeling Language User Guide*, 2nd ed, Addison-Wesley Professional, 2005. The former is briefer, the latter more authoritative.
- I strongly recommend obtaining a copy of Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides, *Design Patterns: Elements of Reusable Object-Oriented Software*, Addison- Wesley Professional, 1994.

**MAJOR TOPICS:**

- Software Engineering: products and processes.
- Java programming
- UML
- Object-Oriented Design patterns
- Software Design principles
- Application of all the above to a major project

**ASSESSMENTS:**

<b>Assignments</b>	15%	Fri Jan 15, Jan 22, Jan 29
<b>Project</b>	50%	Wed Jan 27 (Proposal) Thurs Jan 28 (Meeting) Fri Feb 5 (Requirements) Thurs Feb 11 (Design presentation) Fri Feb 12 (Initial design) Mon Feb 15 (Peer review) Thurs Feb 18 (Meeting), Mar 3 (Meeting) Thurs Mar 10 (1st iteration design presentation and demo) Fri Mar 11 (1st iteration submission) Thurs Mar 17 (Meeting), Thurs Mar 24 (meeting) Thurs Mar 31 (Final design presentation and demo) Mon Apr 4 (Final submission)
<b>Final</b>	35%	TBA

**LEARNING OUTCOMES:**

Upon successful completion of this course, the student will be able to:

	<b>LEARNING OUTCOMES</b> At the appropriate milestones, the student will be expected to be able to:	<b>GRADUATE ATTRIBUTES. LEVEL OF COMPETENCE</b>	<b>Methods of Assessment</b>
1	Understand and document software designs using appropriate linguistic and visual formalisms and tools.	1.3 Knowledge base – sophisticated 4.3 Design – sophisticated. 5.3 Use of tools – sophisticated. 7.3 Communication – sophisticated.	Project design documents. Presentations, Exam.
2	Explain the basics of assertion-based design (design by contract).	1.2 Knowledge base – intermediate. 4.2 Design – intermediate.	Exam.
3	Apply the principles of object-oriented design.	1.3 Knowledge base – intermediate. 4.3 Design – intermediate.	Project design documents and code. Presentations. Exam.
4	Apply major object-oriented design patterns and show familiar with others.	1.3 Knowledge base – intermediate. 4.3 Design – intermediate.	Project design documents. Exam.
5	Manage a modest sized software design project.	6.2 Individual and team work – intermediate. 7.2 Communication – intermediate. 11.1 Economics and project management – introductory.	Project meetings and design documents.
6	Appreciate the advantages of sound modularization and well-defined interfaces.	1.2 Knowledge base – intermediate. 4.2 Design – intermediate.	Project meetings and design documents. Exam.

See [www.mun.ca/engineering/undergrad/graduateattributes.pdf](http://www.mun.ca/engineering/undergrad/graduateattributes.pdf) for more information on the 12 Graduate Attributes you are expected to be proficient in upon graduation.

Each Graduate Attribute for each learning outcome is rated at a level of proficiency between 1 and 3 (1=introductory, 2=intermediate, 3=sophisticated).

**LAB SAFETY:**

Students are expected to demonstrate awareness of, and personal accountability for, safe laboratory conduct. Appropriate personal protective equipment (PPE) must be worn (e.g. steel-toed shoes, safety glasses, etc.) and safe work practices must be followed as indicated for individual laboratories, materials and equipment. Students will immediately report any concerns regarding safety to the teaching assistant, staff technologist, and professor.

**ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT:**

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The Memorial University of Newfoundland Code states that

*All members of the Memorial University of Newfoundland Community, which includes students, faculty, and staff, shall treat others with respect and fairness, be responsible and honest, and uphold the highest standards of academic integrity.*

Students are expected to conduct themselves in all aspects of the course with a high level of academic integrity. Any student found to have committed academic misconduct will be dealt with according to the Faculty and University practices. In particular I would like to call to your attention to the definition of *plagiarism* as

*the act of presenting the ideas or works of another as one's own.*

It is not allowed. More information is available at

<http://www.mun.ca/regoff/calendar/sectionNo=REGS-0748#REGS-0761> and

<http://www.mun.ca/engineering/undergrad/academicintegrity.php>

The Faculty of Engineering and Applied Science Student Code of Conduct is as follows

*Faculty of Engineering and Applied Science  
Code of Conduct*

*Like Professional Engineers, engineering students are expected to behave in a professional manner at all times. Students are encouraged to conduct themselves in a manner consistent with the [PEG-NL Code of Ethics](#).*

*Memorial University has two sets of rules which deal with inappropriate behavior by students. The first set deals with [academic offences](#) such as cheating while the other set deals with [non-academic offences](#) such as disruptive behavior in class.*

*Both sets of rules can be found in the University Calendar under Regulations. It is strongly recommended that students read and follow these rules because the penalties can be severe, the severest being expulsion from the University.*

**INCLUSION AND EQUITY:**

Students who require accommodations are encouraged to contact the Glenn Roy Blundon Centre, <http://www.mun.ca/blundon/about/index.php>. The mission of the Blundon Centre is to provide and co-ordinate programs and services that enable students with disabilities to maximize their educational potential and to increase awareness of inclusive values among all members of the university community.

The university experience is enriched by the diversity of viewpoints, values, and backgrounds that each class participant possesses. In order for this course to encourage as much insightful and comprehensive discussion among class participants as possible, there is an expectation that dialogue will be collegial and respectful across disciplinary, cultural, and personal boundaries.

**STUDENT ASSISTANCE:**



Faculty of Engineering and Applied Science

## Course Outline

ENGI 5895

Winter 2016

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Student Affairs and Services offers help and support in a variety of areas, both academic and personal. More information can be found at [www.mun.ca/student](http://www.mun.ca/student).