Faculty of Arts & Science
New Course Development Form

<table>
<thead>
<tr>
<th>Designator</th>
<th>Number1</th>
<th>Title</th>
<th>Abbrev. Title (Max 30 Characters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC</td>
<td>110Y1</td>
<td>Foundations of Computer Science I</td>
<td>Foundations of Comp Sci I</td>
</tr>
</tbody>
</table>

**Previous Course Code** (rewighted or renumbered courses)

**Division**

Associated with (Division)2

Arts & Science

**Unit** (for joint courses, list both sponsoring units)

Associated with (Unit)

Computer Science

**Fixed Credit Value** (0.5 or 1.0)

Jointly Offered with Course(s)

1.0

**Calendar Description** (50-100 words)

An introduction to the field of computer science combining the tools and techniques of programming (using the Python programming language) with rigorous mathematical analysis and reasoning. Topics include: data representations; program control flow (conditionals, loops, exceptions, functions); mathematical logic and formal proof; algorithms and running time analysis; software engineering principles (formal specification and design, testing and verification). Prior programming experience is not required to succeed in this course.

This course is restricted to students in the first-year Computer Science admission stream, and is only offered in the Fall term. Other students planning to pursue studies in computer science should enrol in CSC108H1, CSC148H1, and CSC165H1/CSC240H1.

**URL**

**Prerequisites**

None

**Corequisites**

None

**Exclusions**

CSC108H1, CSC148H1, CSC165H1

**Recommended Preparation**

**Breadth Requirements**

The Physical and Mathematical Universes (5)

Science

**Distribution Requirements**

**Total Instructional Hours** (usually multiples of 12)

Lecture 72  Practical 24  Tutorial 0  Seminar 0

Available for CR/NCR status

Yes (default)

**Competency Levels** (none, slightly, notably or extensively)

| Critical and Creative Thinking | Extensively | Quantitative Reasoning | Extensively |
| Communication                  | Notably     | Social and Ethical Responsibility | Slightly |
| Information Literacy           | Slightly    |                           |           |

**Experiential Learning** (none, notably or extensively)

<table>
<thead>
<tr>
<th>Research</th>
<th>Other</th>
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<tr>
<td>None</td>
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<tr>
<th>Nature of “Other” Experience Learning</th>
</tr>
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**Proposal Questions – General** *(Complete all fields in this section)*

**Rationale and Academic Relevance**

CSC110Y1 is the first of two courses intended to prepare students for a Computer Science POS, aimed at students admitted to Arts & Science in the first-year Computer Science admission stream. This is one of two pathways into computer science, with the existing pathway (involving CSC148H1 and CSC165H1) still available to students in other admission streams and programs.
The most novel aspect of this proposal is that CSC110Y1 is meant to be a full credit (1.0 FCE) but taken only in the fall semester: a “double course”. This idea developed out of several departmental discussions this summer as a result of a few considerations, which we explain here.

First, the existing first-year CS courses have a divide between “programming” (CSC108H1, CSC148H1) and “theory” (CSC165H1), and this separation of courses enforces a common but incorrect student belief that these two domains are completely separate. By creating a “double course” CSC110Y1, we are able to combine topics from practical programming and computer science theory in every aspect of the course, and so make these connections explicitly and repeatedly throughout the semester. We believe that explicit connections between practical and theoretical concepts will help students in several ways. For example, students who excel from a practical standpoint will see how they can use that strength to understand theoretical concepts (and vice versa). In addition, we can avoid redundancy in the material being taught because we know exactly which computer science concepts have been introduced to students and when.

In addition to relaxing constraints on the sequence of topics being taught, having a single cohort take CSC110Y1 will facilitate community building among first-year Computer Science students. Because of the nature of this “double course”, every week will have 6 hours of active learning lectures and 2 hours of a small group lab practical led by a TA. This is a lot of class time, and we hope to create many opportunities throughout for students to build relationships with each other. This could be done with two concurrent half-courses, but an advantage of this double course is that students will be enrolled in the same section for all 6 lecture hours each week, making it easier to meet people and reinforce tentative friendships in their first few weeks at U of T.

Finally, our department is well aware that this “double course” is a departure from how students (not to mention administrators and instructors) normally envision courses, and so we will be working hard to connect with the first-year CS students to help them understand this structure. During summer course selection, we’ll reach out to ensure they only enrol in three additional courses other than CSC110Y1 in the fall semester. Our course instructors will make clear the expectations around workload for this class being double that of a standard half-course, and will monitor student progress with low-stakes assessments in the first few weeks to quickly identify students who are having difficulty early on.

**Overlap of course content with current courses offered by other departments/programs**

CSC110Y1’s course material overlaps with three other courses: CSC108H1, CSC148H1, and CSC165H1/CSC240H1. These three courses are also offered by the Department of Computer Science, and are requirements for programs in Computer Science and a few other departments.

**Consultation Undertaken** *(Do not leave blank – indicate date of sign-off from external unit, or none required.)*

- Existing instructors of CSC108H1, CSC148H1, and CSC165H1.
- Faculty from other departments that rely on CSC108H1, CSC148H1, and CSC165H1 as program requirements.
- The Department of Computer Science Undergraduate Committee.

**Resources Required**

Access to the CS Teaching Labs is required for the Practical component of the course (2 scheduled hours per week).

<table>
<thead>
<tr>
<th>Resources - Budget</th>
<th>Academic unit will provide these resources from existing budget.</th>
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**Proposal Questions – Undergraduate**

**Programs of study for which this course might be suitable**
Computer Science

<table>
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<th>Instructor <em>(Do not leave blank)</em></th>
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i. E.g., “120H1” or “320Y1” or “295Y0” – include the three digit code, the weight (Y/H), and the number representing the campus (1 = St. George, 0 = Off-campus, for summer abroad/field offerings).

ii. Use “Associated With” fields if your unit is outside Arts & Science; normally only “Associated With (Unit)” is used.

iii. Full credit courses may have one breadth category (counting as 1.0 in that category) or two (counting 0.5 in two categories); half-credit courses may only have one breadth category.

iv. All courses normally may be made credit/no-credit by students. Policy only allows exception for: “courses where an individual student works on independent study or individual research supervised by a professor; First Year Seminars (199s)/Research Opportunity Program (299s)/Research Excursions (399s); Foundational Year Program courses (College Ones, Munk One); Rotman Commerce (RSM) courses; field courses; courses evaluated on a Pass/Fail basis.” (2017-18 Calendar)

v. Indicates an experience that is unusual, unique, or distinctive; this includes community involvement, distinctive practicals or laboratories, field work, internships, international experience or exchange, ROP or REP courses, service learning, or studio. Leave blank for courses including laboratories, term papers, short trips, team projects or self-directed study.

vi. If your course would affect other programs in terms of their program requirements, prerequisites/exclusions, it is essential to indicate such consultation has happened. Otherwise, indicate relevant internal or external consultation as needed (e.g., unit governance, student demand, success as topics course, etc.).
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<td>Foundations of Computer Science II</td>
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**Previous Course Code** (rewighted or renumbered courses)

- Associated with (Division)  
  - Arts & Science

**Unit** (for joint courses, list both sponsoring units)  
- Associated with (Unit)  
  - Computer Science

**Fixed Credit Value** (0.5 or 1.0)  
- 0.5

**Calendar Description** (50-100 words)

A continuation of CSC110Y1 to extend principles of programming and mathematical analysis to further topics in computer science. Topics include: object-oriented programming (design principles, encapsulation, composition and inheritance); binary representation of numbers; recursion and mathematical induction; abstract data types and data structures (stacks, queues, linked lists, trees, graphs); the limitations of computation.

This course is restricted to students in the first year Computer Science admission stream, and is only offered in the Winter term. Other students planning to pursue studies in computer science should enrol in CSC108H1, CSC148H1, and CSC165H1/CSC240H1.

**URL**

**Prerequisites**  
- CSC110Y1 (70% or higher)

**Corequisites**  
- None

**Exclusions**  
- CSC108H1, CSC148H1, CSC165H1

**Recommended Preparation**

**Breadth Requirements**
- The Physical and Mathematical Universes (5)

**Distribution Requirements**
- Science

**Total Instructional Hours** (usually multiples of 12)  
- Lecture: 36  
- Practical: 24  
- Tutorial: 0  
- Seminar: 0

**Available for CR/NCR status**  
- Yes (default)

**Competency Levels**
- Critical and Creative Thinking: Extensively
- Quantitative Reasoning: Extensively
- Communication: Notably
- Social and Ethical Responsibility: Slightly
- Information Literacy: Slightly

**Experiential Learning**
- Research: None
- Other: None

**Nature of “Other” Experiential Learning**

**Proposal Questions – General** *(Complete all fields in this section)*

**Rationale and Academic Relevance**

Students enrolled in CSC111H1 are a single cohort that have met the progression requirements for CSC110Y1. The course continues with topics introduced in CSC110Y1, extending the students’ knowledge of practical programming and computer science theory. The intention is to cover the remaining material that would be taught in CSC148H1 and CSC165H1 but has not yet been covered in CSC110Y1.
CSC111H1 is similar to CSC110Y1 in two ways. First, the course continues to make explicit connections between practical programming and computer science theory concepts (albeit for more advanced material). Second, students will have the chance to continue to build on relationships they established in CSC110Y1 and create new ones in CSC111H1 (i.e., the sections for CSC111H1 are not guaranteed to match CSC110Y1, but there will be significant overlap). The practical lab component (2 hours per week) will be designed as a direct continuation as the labs in CSC110Y1.

**Overlap of course content with current courses offered by other departments/programs**

CSC111H1’s course material overlaps with three other courses: CSC148H1 and CSC165H1/CSC240H1. These courses are also offered by the Department of Computer Science and are prerequisites for courses in several other departments.

**Consultation Undertaken** (Do not leave blank – indicate date of sign-off from external unit, or none required.)

- Existing instructors of CSC148H1 and CSC165H1.
- Faculty from other departments that rely on CSC148H1 and CSC165H1 as program requirements.
- The Department of Computer Science Undergraduate Committee (UGC).

**Resources Required**

Access to the CS Teaching Labs is required for the Practical component of the course (2 scheduled hours per week).

**Proposal Questions - Undergraduate**

**Programs of study for which this course might be suitable**

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