

# Computer Science

## CPSC470: Senior Project Syllabus/Guidelines

Spring 2024

### 1 Introduction

Every student pursuing the Computer Science degree is required to complete a senior project (CPSC 470). The senior project is worth 1 unit. If eligible, the student may choose to complete the work for departmental honors (and the College Honors program, if applicable).

The objectives of this requirement are that students will be able to:

1. identify and comprehend peer-reviewed papers published in conferences and journals,
2. write a proposal that clearly defines a problem, including a literature survey showing that the problem is of interest and is unsolved, and outlines a reasonable methodology to try to solve the problem, and
3. orally, and as a written report, present (1) the problem and the background literature survey to establish that the problem is of interest to the professional community and is unsolved, (2) the methodology, with adequate justification for its soundness, used in trying to solve the problem, and (3) the results of the work, and competently defend the claims made based on the results.

### 2 Research/Project Deliverables

Each student is expected to identify a general area of computer science, and then clearly define the problem in that area that they would like to work on. The student should be able to clearly demonstrate that the problem is unsolved and of interest to the professional community working in the general area.

#### 2.1 Academic Integrity and Honesty

Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be strictly the work of the student unless otherwise specified by the instructor. The policies as outlined in the Academic Integrity handbook will be enforced in the course.

Graded programs are subject to the Roanoke College Academic Integrity policies. Copying a program or a portion of a program (even a single line) or reading another person's program to obtain ideas for solving a problem is plagiarism. Other examples of integrity violation include writing code for someone else, using code written by someone else, telling someone else how

to solve a problem or having someone tell you how to solve a problem (and using his/her method). These cases apply to any work that is handed in for a grade under the instructor's assumption that the work is your own. Unless specified otherwise by the instructor, discussion among students should be limited to general discussion of concepts and language details, not specific aspects of a solution to the assigned problem

The final evaluation of the work will be based on:

1. progress shown during weekly meetings with the course instructor,
2. the written proposal,
3. the final report (including any code that was written as a part of the project), and
4. the final oral defense (presentation) of the work.

## **2.2 Honors Committee (for students seeking Honors)**

Each student must form their departmental honors/college honors committee, as applicable, before the proposal stage.

Based on your area of interest, each student is encouraged to appropriately choose faculty members to be on your committee so that these faculty members can provide relevant guidance. Students are encouraged to form their committee early on so that the committee members can help the student starting with the problem identification stage. Students are strongly encouraged to discuss their progress and seek guidance from all members of their committee through the duration of their project.

Note that the committee is a source of guidance. The project is the student's project, and all work done towards the project must be done by the student. The student will be responsible for justifying and defending every aspect of the work done.

Each student's work will be evaluated by the course instructor (in consultation with the student's committee, if applicable).

## **2.3 Written Proposal**

Each student will do a thorough literature survey in the general area of interest chosen, and thus identify a problem that is of interest to the professional community in that area, is unsolved and that the student would like to work on. During this process, the student is strongly encouraged to communicate with their faculty group for guidance on the literature survey and the identification of the problem to be solved.

Based on the above work, each student will write a formal proposal to work on the identified problem. The written proposal should include:

1. a clear definition of the problem,

2. a comprehensive literature survey to establish that the problem is of interest to the professional community, and that the problem is unsolved,
3. an outline of the possible methodology that would be used to try to solve the proposed problem, and
4. a tentative timetable for completing work.

The written proposal is due to the course instructor (and committee, if applicable) by the deadline (see Section 4 below).

## **2.4 Final Report**

Each student will write a comprehensive report including

1. a clear definition of the problem,
2. a comprehensive literature survey to establish that the problem is of interest to the professional community, and that the problem is unsolved,
3. an explanation of any technical material that the student had to learn to work on their problem,
4. the methodology, with clear justification for the methods used, that the student used to work on the problem,
5. the results of the work, along with formal justification for the validity of the claims made based on the results, and
6. possible future directions in which the problem could be further investigated.

The audience for the final report is future students who may be interested in this work. In particular, the audience is *not* necessarily researchers working in the area. The final report should serve as a springboard for future students to continue the work. The new technical material that a student had to learn to work on the project should be made easily accessible to the future students through this report.

Each student must submit a draft of the report to the course instructor (and all committee members, if applicable) by the deadline for proposal submission (see Section 4 below). at least one week before the oral presentation of the work. The course instructor will give the student comments on the report within one week of receiving the report from the student. The revised final report will be due to the course instructor (and all committee members, if applicable) at least 24 hours before the oral presentation.

### **2.4.1 Code**

Any code written by the student must be made available on a website, with the website being referenced in the final report (and, if appropriate, in the conference/journal paper). The student's code must be well-documented internally for a user to be able to understand and modify the code, if necessary. The student's code website must be well-documented and must contain adequate supporting documents to

1. clearly enable a user to be able to run the code, including instructions
  - (a) for setting up any required third-party software to run the code,
  - (b) to compile and run the code,
  - (c) to create or access, and set up, data files, and
  - (d) to read/interpret the results of the code, and
2. establish the correctness of the code as best as the student is able to do so.

### **2.5 Oral Presentation**

Oral Presentations for the project will be during the last week of classes, and during the exam period.

Students seeking honours (college or departmental) will have a one-hour presentation of their work. It is the student's responsibility to schedule the oral presentation for a one-hour time slot that is convenient to the course instructor (and all committee members, if applicable).

The oral presentation of the work will be a carefully planned 20–25-minute presentation of the work, followed by questions from the instructor (and committee, if applicable) and any other members of the audience. For planning the presentation, the student may assume that the oral presentation is a presentation of the work at a conference, i.e., the audience is researchers in the field. Nonetheless, since the actual audience will not necessarily be researchers in the field, the student should be prepared to answer questions about any of the aspects of the work, including the background literature and any technical material used in the work.

The student will be evaluated on

1. the efficacy of the presentation,
2. the organization of the presentation,
3. a clear demonstration of a good understanding of the literature and methods used in the relevant general area of computer science,

4. a clear presentation of the results of the work, the methods used to obtain the results, and a competent presentation of the claims made based on the results, and
5. the ability to answer questions knowledgeably.

### 3 Format of Written Submissions

The written proposal and the final report should be typeset using L<sup>A</sup>T<sub>E</sub>X in 11-point font, single spaced, with at least one-inch margins on all sides. There is no minimum page requirement for any of the written submissions. There is no specific format needed to have for the list of references, as long as (1) the format used in the list is consistent, (2) there is enough information in each reference to be able to find the source easily, (3) the name of the outlet (conference/journal) where a source is published is spelt out fully (i.e., the source is not identified using only an acronym, or an abbreviation), and (4) if the reference is to a website, then the date of the last time the website was accessed is stated as a part of the reference.

### 4 Deadlines

**Saturday, Feb. 10** Written proposal due by 10pm.

**Saturday, Apr. 20** Draft of report due by 10pm.

As noted above in Section 2.3, the final report will be due at least 24 hours before the oral presentation.

### 5 Evaluation

The final grade will be calculated according to the following weights on components:

Written Proposal	40%
Final Report (including code)	40%
Oral Presentation	20%

The final grade will be assigned according to the following scale:

< 60	60-62	63-65	66-69	70-72	73-75
F	D-	D	D+	C-	C

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76- 79	80- 82	83- 85	86- 89	90- 92	> 92
C+	B-	B	B+	A-	A