Computer Science I.S. Student/Advisor Guidelines

Independent Study is the student's opportunity to do a significant piece of work in an area of personal interest and to expand his or her understanding of computer science. This guide provides a description of what the I.S. advisor expects from the student.

1) Project Topics

Although the faculty advisor must approve all topics, the student is free to pursue virtually any area of computer science that is of interest. The topic should be challenging, but manageable with the resources and time available. A typical I.S. involves a theoretical investigation of a topic in Computer Science accompanied by a software implementation that illustrates concepts developed in the theoretical investigation.

2) Project Submissions

It is the student’s responsibility to meet all deadlines and submission requirements, and to contact their advisor for clarification when necessary.

Project Abstract
The project abstract is a formal document, not a slip of paper with a few vague ideas on it about what the student thinks would be interesting to do. In order to receive approval for a project, the student will present a proposal outlining the following.

1. The project's focus (e.g., examine artificial intelligence and speech synthesis, investigate microcomputer security, examine the importance of documentation (human factors, etc.).

2. The project's objectives in terms of the topics that the theoretical portion of the IS thesis will cover, the software or documents that the project will produce, and the learning that will result from accomplishing the project.

3. The efforts that will contribute to the project: programming, interviews, special library research, trips, and needed materials (languages, machines, documentation, etc.).

4. Potential problems in the project that might become trouble spots. Identify the challenges the student might encounter in accomplishing the project. The student should investigate whether these trouble spots could make the rest of the project impossible if they can't be surmounted.

5. A suggested timetable specifying the points throughout the two semesters at which the various phases of the project will be complete.
6. A minimum of five references (journal articles, technical reports, books) on your proposed topic. Online references are not, generally, acceptable.

**Annotated Bibliography**
An annotated bibliography is a bibliography in which each entry includes a description of the entry’s content and the role it might take in the research. This description is not a copy of the entry’s abstract.

**Thesis Outline**
The thesis outline is a proposed table of contents for the thesis. The table of contents should include a project title and a specification of chapters and sub-sections, each annotated with a title.

**Project Research**
The project should begin with a substantial amount of library research. The description of this research should involve a clear exposition of the problem or research area, an annotated bibliography, and an outline for conducting the research.

**Completed Chapters**
In mid-October, the student will reach an agreement with his/her advisor about which chapters are to be completed as a prerequisite to satisfactory completion of the first semester of Senior IS. These chapters must be submitted by the date given on the timeline later in this document. A completed chapter is not an outline or a draft, but a chapter that has been through at least one review by the advisor. Satisfactory progress in the first semester should result in approximately 25-30 well written pages that are free of grammatical errors and that contain proper citations in the ACM format.

**Preliminary Software**
In mid-October, the student will reach an agreement with his/her advisor about the software component that is to be completed as a prerequisite to satisfactory completion of the first semester of Senior IS. The software component may consist of a prototype showing proof of principle, a set of software modules, data analysis using a software tool, etc.

**Digital Submission**
The I.S. in LaTeX format as a pdf file, the I.S. abstract in text format, source files and results are provided in digital form, on a CD, DVD, USB, or other digital media, to the advisor before the oral defense.

**Poster**
This document represents the I.S. in poster form and must be presented during the Senior I.S. Symposium. The student must register for the symposium. The Dean of Faculty Development typically announces, in mid-February, the registration deadline and requirements for symposium presentations.
3) Guidelines for Professional Conduct

The student will meet with the advisor once a week and will provide 24-hour notice when unable to attend a meeting due to illness or a personal problem. The student will come prepared to discuss ideas relating to the project, review progress, and map out work to be done. It is expected that 10 - 12 hours per week will be dedicated to the I.S. and that progress toward completion of the project will be demonstrated on a weekly basis. The student will respond to all e-mail correspondence from the advisor in a timely manner. The student will submit for review all presentation slides and the symposium poster to the advisor, typically a week before their due date. It is the student’s responsibility to contact their advisor with questions concerning submission deadlines, submission format, etc.

4) Document Submission and Oral Presentation Schedule

All Computer Science I.S. students will meet as a group to give a brief presentation of their work to that point (see timeline below).

With the exception of the oral defense and preliminary I.S. meeting, the student will submit a typed document for each item by 4:00 PM on the indicated day. The poster is submitted online following the directions announced by the Dean of Faculty Development. The student will submit the final thesis to the Registrar's office on the indicated day; all other documents will go to the advisor. Advisors will not discuss assignments with students on the day they are due or the day before.

Junior Year Schedule

Attend preliminary Senior I.S. meeting – Department Chair announces time and place of meeting.

Junior Year, Second Semester, Friday of last week of classes – I.S. Preliminary Proposal must be submitted to the Department Chair.

Senior Year Schedule

Email your advisor a copy of the following table, where the weeks have been replaced by the calendar date of your corresponding meeting day for the indicated week

<table>
<thead>
<tr>
<th>Week</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week1</td>
<td>Project Abstract</td>
</tr>
<tr>
<td>Week 3</td>
<td>I.S. Student Meeting, Taylor Hall, T 11 – 12:00</td>
</tr>
<tr>
<td>Week 6</td>
<td>A five-minute presentation on your I. S. topic</td>
</tr>
<tr>
<td>Week 6</td>
<td>Thesis outline and agreement on the chapters to be completed by the end of the semester</td>
</tr>
</tbody>
</table>
Annotated bibliography Week 8
Chapters and preliminary software specified in above agreement completed Last week of classes, Fall
Final draft Last week before Spring break
Final thesis End of Spring break
Digital Media, Poster,
Senior Exit Survey One week after Spring break
Oral Defense TBA

5) Grading
Fall Semester

The list below specifies point allocations. The maximum possible total points are 100. The number of points awarded in each category will measure promptness, clarity of presentation, thoroughness, and consistency with documents already submitted. To obtain a satisfactory (S) grade in CS 451, the student must complete all indicated submissions and receive at least 80 total points of credit.

Project abstract 10 points
Five-minute oral presentation on project abstract 10 points
Thesis outline and annotated bibliography 30 points
Completed chapters and preliminary software 35 points
Attendance 15 points

Grade for first semester:
S: 80 to 100 points
NC: 0 to 79 points

Spring Semester

The spring semester grade (H, G, S, NC) is an evaluation of the final thesis, the oral presentation, the organization of the project effort, and participation in the I.S. Symposium. Part of this evaluation includes attending weekly meetings, providing
timely and grammatically clean drafts, and demonstrating weekly progress. The following criteria determine the final grade. You should also look at the attached evaluation rubrics for the thesis and oral presentation.

6) Grading Criteria

Content
The content of the independent study document must meet the requirements agreed upon by the advisor and advisee. These requirements will differ for each project.

Form
The final document is evaluated for mechanical and grammatical errors. The text must be well organized, grammatically correct, and complete - including a table of contents, an introductory and conclusion chapter, a bibliography, and a user manual if necessary.

Methodology
The essential factor here is the degree to which the student has approached the project in an organized and efficient manner and has applied effort consistently throughout the entire year. The quality and promptness of intermediate submissions is highly important. A major item is the promptness and quality of the rough draft submission since it measures the ability of the student to effectively coordinate the research effort in an efficient manner. Attendance and presentation issues from the first semester will carry a heavy weight for this criterion. Participation in the I.S. Symposium is also factored into the grade for the Methodology category.

Oral Presentation
Grading of the oral presentation evaluates the organization, spontaneity, flow, continuity, and comprehensibility of the presentation. It also evaluates the student's ability to respond to reasonable questions and explain points of confusion. The student should use visual aids as a means of guiding the presentation, but should avoid reading material to the audience. The presentation should last approximately thirty-five minutes to permit approximately fifteen minutes for questions and extended discussion. A major challenge of the presentation is to identify the key points to cover in giving a good description of the project in a relatively short time period.

7) Paper Formatting

Overall Document
Left margin 1.5 in
Right margin 1.25 in
Top margin 1 in
Bottom margin 1 in
Pages should also be numbered
Double-sided and Spiral bound
Chapters start on a new page
Theorems, lemmas, examples, corollaries, definitions, propositions, remarks, notation, terminology, figures, and tables numbered within Chapters.

**Title page** (no page number - everything centered except Advisors which are on left margin)
Title
Independent Study Thesis
Presented in Partial Fulfillment of the Requirements for the Degree Bachelor of Arts in the Department of Mathematics and Computer Science at the College of Wooster by
Author
The College of Wooster
Year
Advised by:
Advisors

**Frontmatter** (Page numbers at bottom of pages)
Blank page hidden page number
Copyright page (optional and hidden page number)
Abstract (roman page number (ii or iii based on copyright or not))
Dedication (optional)
Acknowledgments (optional)
Vita (optional)
Table of Contents
List of Figures (only needed if there are figures)
List of Tables (only needed if there are tables)
List of Listings (only needed if there are code listings)
Preface (optional) (A chapter which is not numbered or lettered)

**Mainmatter**
Numbered Sections (Page numbers in arabic, first page number of chapter centered at bottom, remaining page numbers in upper right and running header on upper left (Chapter number Chapter title))
Introduction (Chapter 1)
Body (Chapters 2-?)

**Backmatter**
Lettered Sections (Page numbers in arabic, first page number of appendix centered at bottom, remaining page numbers in upper right and running header on upper left (Appendix letter Appendix title))
Appendices

**Sections not lettered or numbered**
Afterword (optional)
References
Index (optional) (two column alphabetized)
8) CS 452 EVALUATION RUBRIC (REVISED FALL 2017)

This rubric serves as a starting point for discussion among the CS faculty about CS 452 grades. Not all questions apply equally well to every project, and some are only appropriate for the first reader. Roughly speaking, a score of 4 in an area corresponds to Honors-level achievement, 3 to Good, and 2 to Satisfactory, with 1 and 0 indicating substandard performance. However, the way in which these elements are weighted is topic-dependent, and a particular set of scores does not guarantee a certain 452 grade. For double majors, the evaluation of the project from the perspective of the other discipline is also significant in determining the grade.

1. **Depth of Material Covered** – Based on the material covered in your weekly meetings with the student, and the final written document, which statement best describes the depth of the student’s investigation?
   - **(4 - Exceptional)** The student did a thorough investigation into this topic, providing examples and going well beyond the minimum depth required of a 2-semester project.
   - **(3 - Strong)** The student did a comprehensive summary of this topic, providing examples and personalizing the material.
   - **(2 - Adequate)** The student did a good summary of the material, and went into a depth appropriate for a 2-semester investigation.
   - **(1 - Marginal)** The student covered some topics well, but failed to go into enough depth with others.
   - **(0 - Unsatisfactory)** The student has a brief summary of the material, but did not achieve the depth required of a 2-semester investigation.

2. **Student Understanding and Mastery of the Subject** - Based on the weekly meetings with your I.S. student and the final written project, which statement best describes this student’s understanding of the content in the I.S.?
   - **(4 - Exceptional)** The student has a thorough understanding of this material and should be able to answer probing questions on any of the content.
   - **(3 - Strong)** The student has a good understanding of this material but may have difficulty answering probing questions.
   - **(2 - Adequate)** The student has a good understanding of some portion of this material, but approximately _____% of the work was completed without the benefit of discussion with the advisor.
   - **(1 - Marginal)** The student has some difficulty understanding a significant portion of the material and will have difficulty answering questions.
   - **(0 - Unsatisfactory)** The student lacks a basic understanding of the fundamental ideas contained in the written document, and will not be able to answer questions.

3. **Independence of Learning** (for first readers only) – Based on the weekly meetings with your I.S. student, which statement best describes the student’s initiative and independence throughout the process?
   - **(4 - Exceptional)** The student demonstrated strong initiative and independence, requiring only a minimal amount of guidance.
   - **(3 - Strong)** The student demonstrated good initiative and worked mostly independently, requiring an appropriate amount of guidance.
   - **(2 - Adequate)** The student was self-directed for some of the thesis, but required lots of guidance on other parts.

An example of a completed thesis can be seen in the LaTeX IS Guide found at: https://wiki.wooster.edu/display/latex/Downloads
• (1 - Marginal) The student was unable to work without strict deadlines and lots of guidance regarding the direction of the thesis.
• (0 - Unsatisfactory) Despite deadlines and guidance from the advisor, the student failed to complete work in a timely manner.

4. Assimilation of Material – Based on your discussions with this I.S. student, the bibliography, and the final written document, which statement best describes the student’s assimilation of the material?
• (4 - Exceptional) The student assimilated material from a wide variety of sources.
• (3 - Strong) The student used material from multiple sources and did some assimilation of that material.
• (2 - Adequate) The student used material from multiple sources.
• (1 - Marginal) The student primarily used one source, but did use some material from at least one other source.
• (0 - Unsatisfactory) The student used one primary source from which all material is taken.

5. Form/Writing Quality – Which statement best describes the quality of the student’s writing in the thesis including organization, readability, form (grammar, spelling, typesetting), and style?
• (4 - Exceptional) The I.S. is written in a clear and well-organized manner, with excellent grammar, spelling, and typesetting. Moreover, it is written in the student’s unique style and directed toward an audience of peers.
• (3 - Strong) The I.S. is well-organized and very readable, with few errors in spelling, grammar, or typesetting.
• (2 - Adequate) The I.S. is well-organized and readable, despite some errors in spelling, grammar, or typesetting.
• (1 - Marginal) The I.S. is somewhat difficult to read because of weak organization, lack of clarity, and a number of errors in spelling, grammar, or typesetting.
• (0 - Unsatisfactory) The I.S. is quite difficult to read because of disorganization and of poor grammar.

6. Project – Which statement best describes the quality of the project including project goals, design, and relevance to the thesis?
• (4 - Exceptional) Project goals are clearly stated and are complete. The project is an excellent illustration of the thesis topic. Project design is excellent; it is detailed and covers all project goals.
• (3 - Strong) Project goals are nicely stated and mostly complete. The project provides a good illustration of the thesis topic. Project design is good; some details may be missing or some goals not clearly covered.
• (2 - Adequate) Project goals are presented and are understandable. The project adequately illustrates the thesis in broad terms with varying degrees of depth. Project design is present, but lacks detail or doesn’t include all project goals.
• (1 - Marginal) Project goals are incomplete or unclear. Some aspects of the thesis are not covered or are covered only superficially by the project. The design exists in broad form only and doesn’t clearly cover some of project goals.
• (0 - Unsatisfactory) Project goals are unclear, vague, or missing altogether. The link to the thesis is unclear or the project is not relevant to the thesis topic. Design is missing or very superficial.

7. Project Implementation – Which statement best describes the quality of the project implementation including completeness, quality, correctness, planning, use of resources, etc.?
• (4 - Exceptional) The project is completed as designed and is of high quality. Correctness can be demonstrated. Resources (equipment, software tools, library, etc.) are used creatively.
• (3 - Strong) Most of the project is completed as designed and is of generally high quality. Some components may be missing, incomplete or incorrect. Good use of resources.
• (2 - Adequate) Most of the project is completed as designed and is of generally good quality. Some components are missing, incomplete or incorrect. Resource usage is adequate.
• (1 - Marginal) Many components are incomplete or incorrect. Overall quality of the project components is poor. Poor use of resources; lack of awareness of available resources.
• (0 - Unsatisfactory) Project largely incomplete or incorrect. Very poor use of available resources or resources used inappropriately.
8. **Project Results** – Which statement best describes the quality of the project results including relevance to thesis and completeness (Note: results need not be positive)?

- **(4 - Exceptional)** All components of the project produced results that are clearly relevant to the thesis. All of the thesis’ goals are covered by the results.
- **(3 - Strong)** All or most components produced results relevant to the thesis. Most of the thesis’ goals are covered by the results.
- **(2 - Adequate)** Most project components produced results relevant to the thesis topic. Most of the thesis’ goals are covered by the results.
- **(1 - Marginal)** Results are largely incomplete or are only loosely relevant to the thesis. Many aspects of the thesis are not present in the results.
- **(0 - Unsatisfactory)** No results or results irrelevant to the thesis. Much of the thesis is not demonstrated in the results.

9. **Presentation** – Which statement best describes the quality of the student’s final oral presentation, considering organization, knowledge of content, audience awareness, and professionalism? (For double majors whose oral exam begins from a poster, rather than an oral presentation, consider the poster instead.)

- **(4 - Exceptional)** The presentation was excellent overall, and strong in each of these aspects.
- **(3 - Strong)** The presentation was solid, with only minimal problems in any of these aspects.
- **(2 - Adequate)** The presentation was acceptable, despite some weakness in one or more aspects.
- **(1 - Marginal)** The presentation was substantially hampered by a pronounced weakness in at least one aspect.
- **(0 - Unsatisfactory)** The presentation was unacceptable, with pronounced weaknesses in multiple aspects.

Additional comments: