STS 4500
STS and Engineering Practice

Course Overview

STS 4500 engages students with the idea that success in posing and solving engineering problems requires attention to the social dimensions of professional endeavors and practice. Students learn about the ways that STS approaches can positively shape engineering practice and apply STS theories and methods to the undergraduate thesis project.

The major deliverable for STS 4500 is a prospectus that describes the topics and approaches of the STS Research Paper and the Technical Report. The Thesis Project Prospectus frames both projects as responses to a significant problem that has both technical and social dimensions.

Students must complete the STS 1500 and STS 2XXX/3XXX requirements before enrolling in STS 4500. Students who are using a capstone or design course as the source of their technical topic must be simultaneously enrolled in that course or complete it before they enroll in STS 4500.

This general syllabus describes the features of STS 4500 that are common to all sections of the course and focuses primarily on the thesis-related aspects of the course. It provides a framework that STS instructors will expand on in the specific syllabus for their section(s).

Distribution of Credit

Required Thesis-Related Assignments as Detailed in the Adjacent Column
50%

Additional Readings, Assignments, and Activities
50%

Instructors will provide their sections with details about how the 50% designated for additional readings, assignments, and activities will be allocated. Class attendance and participation may be credited as a multiplying factor, between the limits of .75 and 1.25, applied to the sum of credits or included in the distribution of credits. Instructors will establish policies regarding communication, excused versus unexcused absences, and late work. All students must have an approved prospectus to pass the course.

Milestones

Statement of Topics (5%)
Wednesday, September 24 or Thursday, September 25
~750 words
Submitted to STS advisor only

Annotated Bibliography or Review of Literature (15%)
Due date determined by STS advisor
Details specified by STS advisor
Submitted to STS advisor only

Prospectus (30%)
Wednesday, November 5 or Thursday, November 6
~1750 words, excluding citations, references, and illustrations
Submitted to both advisors, grade assigned by STS advisor

Technical Advisor’s Approval of Prospectus

No later than Tuesday, November 25
Technical advisor’s signature on title page documents technical advisor’s agreement to serve as thesis technical report advisor
Goals: STS 4500’s Contribution to ABET Outcomes

This course helps to satisfy a number of ABET outcomes, most importantly an ability to identify, formulate, and solve engineering problems; an ability to communicate effectively orally and in writing; and an understanding of the impact of engineering solutions in a global and societal context.

After taking STS 4500, students should be able to

- use STS concepts and research to identify, formulate, and develop approaches to engineering problems
- frame engineering projects so that their social significance is apparent
- use evidence, reasoning, and imagination to understand the impetus behind new engineering endeavors and to envision both the positive and negative potential of engineering solutions in a global and social context

In STS 4600, students will build on the foundation established in STS 4500 to complete the STS research paper, write a Sociotechnical Synthesis that establishes the relationship between the STS and technical projects, and compile a thesis portfolio that will be archived in the Science and Engineering Library of the University of Virginia. Students will also learn how to identify and analyze the ethical dimensions of technological design, technology use, and engineering practice.

Readings/Resources/Undergraduate Thesis Manual Online

The goals outlined above can be achieved in many ways. Individual instructors will choose appropriate readings and other experiences from the wide array of materials and options available and identify these on a supplementary syllabus specific to their section(s) of STS 4500.

Most of the material that previously was distributed in hard copy as the Undergraduate Thesis Manual has been organized as individual modules on specific topics and migrated to the Brown Science and Engineering Library subject guide for “Science, Technology, and Society.” To access these modules, go to http://guides.lib.virginia.edu/sts and follow the link for STS 4500. The modules are under the heading “Thesis Guide” and cover the following topics:

- The History of the SEAS Undergraduate Thesis
- Honor Guidelines for STS Papers
- Professional, Ethical, and Legal Issues Outside the Scope of the University of Virginia Honor System
- Special Considerations for Independent Projects

The STS Subject Guide contains many other useful materials, and the library will offer workshops, tutorials, and other services to support your thesis project. Your instructor will provide details on taking advantage of these resources.

Instead of or as a complement to these resources, individual instructors may require students to purchase a hard copy reference work such as Hacker’s A Pocket Style Manual, Turabian’s Student’s Guide to Writing College Papers or Alred and Oliu’s Handbook of Technical Writing. Instructors may also require students to work through the writing tutorials that have been developed by the University of Virginia Writing Program and are available at http://www.groundsforargument.org/drupal/welcome. In any case, the readings will help students achieve the learning outcomes of the course and provide support for writing thesis-related documents.

The Honor Code and STS Assignments

The University of Virginia Honor Code applies to all assignments submitted in STS 4500 and 4600. Because some forms of aid are allowed for all assignments in STS 4500 and 4600—and because instructors may on occasion authorize additional forms of aid—the pledge for STS papers should read as follows:
On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for STS papers.

According to these guidelines, authorized aid includes

- assistance from a University-sponsored writing center or tutor
- writing aids such as spelling and grammar checkers
- reference works such as handbooks, thesauruses, and dictionaries
- re-using text you produced for earlier thesis-related documents
- collaborating with members of an officially recognized team to gather sources and write descriptions of your technical topic

No other aid is authorized unless your instructor explicitly authorizes it. If in doubt, ask for clarification.

On occasion, instructors may authorize critique, which is reading and evaluating someone else’s work without suggesting or making specific changes in the work. Critique is designed to improve not only the document in question, but also to increase student understanding of what constitutes quality in a particular assignment. In such cases, the instructor will be specific about what is and is not permitted.

As a matter of policy, editing and proofreading are not permitted on individually authored assignments. Both involve making specific changes to correct or improve a work. While editing or proofreading by others may improve a particular document, they usually do not increase the competence of the author and can obscure areas where the author needs to develop additional expertise.

The Undergraduate Thesis Manual module “Honor Guidelines for STS Papers” explains why academic integrity matters, contains the Honor Committee’s definitions of four different kinds of academic fraud, and offers advice on avoiding academic fraud.

Contents of the Thesis Portfolio Produced in STS 4500 and 4600

1. Title page for binder
   - lists titles of Technical Report and STS Research Paper and identifies author and degree program
2. Sociotechnical Synthesis
   - ~750 words; individually authored executive summary of both projects
3. Technical Report
   - with technical advisor’s signature on title page
4. STS Research Paper
   - 3,000-3,750 words; individually authored; with STS advisor’s signature on title page
5. Thesis Project Prospectus
   - ~1750 words; with both advisors’ signatures on title page

Format and Other Requirements for the Prospectus, STS Research Paper, and Final Binder

- Margins 1” on all sides
- 12 point font
- Title pages conforming to the templates available on STS Subject Guide, including the student’s signed pledge
- Page numbers located on bottom right of pages
- Double spacing of all text except for captions and individual entries in reference lists
- References formatted in American Psychological Association (APA) style
- Permanent strip binding, clear plastic front cover, and solid back cover
- Submitted for archiving in the library at the end of STS 4600
Comparing and Contrasting the Two Categories of Theses: A Summary

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<th>Capstone/Senior Design (C/SD)</th>
<th>Independent</th>
<th>Notes</th>
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<td>All students have two advisors: a technical advisor and an STS advisor.</td>
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<td>Students in the capstone/senior design category are taking two separate courses (STS and the C/SD) that have different goals and different disciplinary perspectives. The two courses are complementary but not tightly coordinated. For example, documents created for one course will typically not fulfill the requirements of the other course.</td>
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<td>STS instructors serve as the STS advisor for all students in their sections of STS 4500 and 4600.</td>
<td>Most students choose the same instructor for 4500 and 4600; however, this may not be possible or desirable. Changing STS instructors should not create a problem for students.</td>
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<td>Students enroll in a senior design or capstone course that serves as the source of the technical topic.</td>
<td>The technical topic derives from a special interest or research/design experience other than a course.</td>
<td>Students in a senior design or capstone course may elect to do an independent thesis but still must fulfill the senior design/capstone requirement.</td>
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<td>Students receive course credit for their technical work and their work is graded.</td>
<td>Students may or may not receive course credit or a grade for their technical work.</td>
<td>Students in the independent track who want to receive credit for independent thesis work may be able to register for an independent study under their technical advisor’s supervision.</td>
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<td>Teams of various sizes work and write collaboratively.</td>
<td>May be individual or team projects</td>
<td>Collaborative writing is permitted but not required for the technical topic descriptions in the Statement of Topics and Prospectus.</td>
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<td>The process of identifying topics, forming teams, and obtaining the necessary resources is managed by each student’s department/degree program.</td>
<td>Students identify their topics and obtain the necessary resources through their own initiative or are sought out by a faculty member who provides some or all of the support needed for the project.</td>
<td>Independent projects require more initiative and self-discipline on the student’s part, and, because they are usually undertaken in addition to a capstone or design course, increase the student’s workload.</td>
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<td>The technical advisor is the faculty member teaching the senior design or capstone course.</td>
<td>The technical advisor is any U.Va. faculty member with relevant expertise who is willing to serve as a thesis advisor.</td>
<td>Students may draw on the expertise of individuals who are not members of the U.Va. faculty or experts in addition to the technical advisor but should have only one technical advisor of record in each semester.</td>
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<td>The technical advisor determines the genre, length, authorship, and due date for the technical report.</td>
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<td>The technical report must be completed in time for it to be incorporated into the final binder that must be submitted before the student receives a grade for STS 4600.</td>
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<td>Students can complete a substantial amount of the research for their STS Research Papers in STS 4500.</td>
<td>Completing the STS research early means that students have more time to devote to their technical work in their last semester.</td>
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<td>Students usually get the most benefit from the thesis project if the technical topic and STS research are related to each other.</td>
<td>Students may choose an STS research topic that is unrelated to their technical topic as long as that topic involves both (a) an engineering practice or a specific technology and (b) some aspect of the broader social context of this engineering practice or technology. Students are most likely to succeed with an unrelated topic if they already have expertise that is relevant to that topic.</td>
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<td>The STS topic may arise directly from the technical topic (be tightly coupled), or it may arise in the broader research area of which the technical topic is a part (be loosely coupled).</td>
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