DIS Senior Project

Syllabus, Spring '19
Wednesdays, 1:00-4:50am, Sage 2211
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Office Hours: Tuesdays, 1-2pm; Wednesdays, 12-1pm

This is your senior project syllabus: it contains important information on the work we will be doing over the next semester. Have it with you at *all* sessions to add notes and comments.

Important notes
- This class is a **capstone project**: it is my **top priority** for your education. It should be yours, too.
- **Attendance is mandatory** – no incompletes will be given for this course. **Read over course policies below**.
- This is a **daunting** project: you will get up-close and personal with a topic of *your* choosing, and this is new to you. **You will feel a lot of emotions** and that's **O.K.** Your peers and I are here to support you throughout this project.

Official description

DIS Senior Project serves as a capstone course for DSIS majors. Students work individually, supervised by a faculty member, to produce a written thesis. Class time largely operates as structured research and writing assistance, where students support one another with peer-review as well as receive one-on-one guidance from the instructor. This is a communication-intensive course.

Student learning outcomes

Upon completion of the Senior Project course, students will be able to:

- Draw from previous courses and experiences to identify various kinds of research methods and what lines of inquiry they support.

- Identify relevant readings and construct a literature review that supports independent research both in *context* and *rationale*.

- Apply social science, arts, humanities, design, and other skills acquired throughout their education as groundwork for a design project.

- Develop a research project, including project management skills, to direct and persist with independent research, resulting in a completed *senior thesis*, *prototype*, and *poster*.

<u>Your senior project</u>

DIS Senior Project is your capstone course for the Design, Innovation, and Society major. Whereas in previous studio classes you have largely been directed towards particular themes for projects, in Senior Project you will be working on *a project of your choosing* and you will be largely self-directing and managing your own work. Rather than lecture-based classes, our class time will function as structured research and support (from both myself, as your instructor, as well as your peers).

The (broad) theme for the DIS Senior Project is *Socially Responsible Research and Design*. You will be using the design skills acquired over the past semesters to design systems and artifacts in a *socially responsible* manner. You are expected to draw heavily from your unique position as a designer *as well as* an STS student (remember: PDI is housed in the department of Science and Technology Studies!).

The project will initially seem daunting and you are expected to spend roughly 10-12 hours/ week *outside of class hours* working on this project, but remember that *you are prepared for this* and you will have help along the way. If you are struggling to keep up, please come speak to me sooner rather than later. You have a wide range of knowledge and resources to bring in (e.g. design research methods, STS and social science/humanities research, user testing, other students in class, other external STS faculty/graduate advisors).

Over the course of the semester you will be…:

1. Identifying a project and a social issue that you would like your project to address. (I ask that you consider *past projects* from *previous studios* – picking up projects from the past that you were enthusiastic about, because of the social issue they addressed, is a *strong learning opportunity* of how far you've come along in the past semesters!)

2. Identifying STS faculty and graduate students with relevant expertise in your topic area that can help identify literatures, complexities, and interlocutors to frame your design process.

3. Using preliminary design research methods to identify specific interventions that a single project, to be completed in the course of a semester, can address.

4. Developing several rounds of conceptual sketches that relate to the social issue you are addressing and gather feedback on sketches from the course instructor, peers, external STS advisors, and those impacted by the specific intervention space. You must accompany these design concepts with explanations of how they are intended to function in-context.

5. Developing "functional" prototypes of your refined concepts. In general, these prototypes function as "Looks-Like" and/or "Works-Like." You are expected to make appointments with the relevant resources (e.g., Abe in the wood/metal shop, Mike in the Digital Fabrication Shop, The MILL, TVCoG, etc) to ensure that the craft dimensions of your design are adequate for testing purposes.

6. User-testing your prototypes with the appropriate population and use this feedback to further refine your concept.

7. Developing an accompanying presentation and poster.

8. **Writing a thesis document** that includes an Introduction, Literature Review, Narrative of the Design Process, explanation of the State of the Design at the end of the semester, and Next Steps.

Assignments and grade breakdown

Assignments contribute to your final grade in the following manner:

	Assignments	Weight	Due
1	**Project Proposal**	**10%**	
2	**Iterative assignments:**	**40%**	
	Annotated bibliography 1	20%	
	Presentation 1	20%	
	Annotated bibliography 2	20%	
	Presentation 2	20%	
	Final presentation	20%	
3	**Senior Thesis**	**40%**	
	Literature review draft	5%	
	Introduction draft	5%	
	Final document	75%	
	Poster	5%	
	Final prototype	10%	
4	**Engagement**	**10%**	
	Participation	75%	
	Extracurricular events	25%	

Grading Scale

A 93-100 **A-** 90-92
B+ 87-89 **B** 83-86 **B-** 80-82
C+ 77-79 **C** 73-76 **C-** 70-72
D+ 67-69 **D** 60-66
F 59 and below

(**A+** does not exist in the Rensselaer grading scale. However, should you excel in Senior Project (i.e. ≥98), I will happily write a letter of commendation to be added to your transcript.)

Because of the fast pace of classes and the iterative nature of assignments, late penalties are particularly harsh: assignment deadlines are *hard deadlines*. I will remind you of the dates above but highly recommend you add them to your agendas from the first week of class.
Late penalties:

• Up to 24h late: lose 15% of assignment grade.
• Up to 48h late: lose 30% of assignment grade.
• Later than 48h: *no credit given*.

Written work is expected to be handed in using the module LMS (which is where you will find course readings and the discussion fora we will be using throughout the term) unless otherwise stated. They are due by 11.59pm of the due date.

Prototypes are expected to be handed in *by the end of studio time* on the due date with the exception of the final prototype, which *should be handed in with your poster* on the due date at my office, by 5pm.

Presentations will be given *in class* on the dates above. As with other class absences (see course policies below), the only excusable absences are illness, family emergencies, and scheduled Rensselaer athletic events. If you miss the presentation date, you will be expected to present either the week before or after. If you do not present, no credit will be given.

Required texts

There are no required texts for this course, but I recommend that you acquire Judith Bell (2014), *Doing your research project: a guide for first-time researchers* to read more into how to manage your very first self-directed research project. There will often be assigned reading— some are already in the term calendar below. Others will be added to LMS as we go along. When we *do* have readings, you are expected to have come to class prepared for discussions. You will also be required to come with work accomplished every week, and this will serve to direct conversations too.

Assignment descriptions

Project Proposal

This proposal constitutes 10% of your final grade. Your project proposal will be the first "warm-up" assignment you will hand and it will be used to provide initial feedback on the direction you are thinking of going. Your problem space is unlikely to shift in the course of the semester as we do not have much time, but you will likely pivot your actual artifact from the proposal, *and that's absolutely fine*. Your proposal will have approximately 2000 words, not counting a brief conclusion and your list of sources. The following is a proposed structure (yours may be different!), but you should address the points below:

- Introduction (400 words):

Your introduction is always important: it provides a brief overview of what your project is, what you will be addressing throughout the proposal, and is meant to capture your readers' attention (and perhaps even imagination).

- Problem space (600 words):

Here you are to provide a nuanced description of your problem space: what is it? How did you come to it? Why is it a social issue? Why is it a fitting space for you to focus on it for an entire semester? And, very importantly, how does this space allow you to enact your identity as DIS student in Rensselaer (remember what makes this program unique)?

- Proposed design artifact (500 words):

In this section, you should describe the artifact that you imagine creating to embed into and improve the problem space above. Discuss why you think this artifact addressed the issue and what type of prototyping you envision doing. You should also briefly discuss why this design is an appropriate "senior project" (how does it draw from your past experience at Rensselaer?).

- Engagement with Socially Responsible Research (500 words):

The theme of your senior project is Socially Responsible Research and Design. This section is meant to get you to engage with the idea of social responsibility. Explain how your design will

be responsible: what type of community engagement do you envision undertaking, how will you ensure that your work is ethically guided?

- List of sources:

Provide a list of 25 sources of interest to your design and problem space, at least 20 being peer-reviewed sources from the list of academic journals in the appendix. You may also provide images, but they will not count towards the numbers (though they will be useful for your second annotated bibliography!).

Iterative assignments

There are five iterative assignments to be handed in throughout the semester. They are all marked out of 10, and their combined average is worth 40% of your final grade.

Annotated Bibliographies

Annotated bibliographies are a small collection of readings on a given topic that give an overview of the topic and include a brief summary of each of the readings. You will hand in *two* annotated bibliographies that show the reading work you have been doing and will hone your ability to *summarize, synthesize* as well as *analyze* topics of discussion. All articles and books annotated must come from *peer-reviewed sources* (see Appendix with a non-exhaustive list of approved sources for good starting points).

These peer-reviewed sources serve several purposes. They will give you a deeper understanding of the nuances of the social problem you are attempting to address, as well as activist, economic, and sociological efforts to address that problem. They will also provide you with a *theoretical framework* or *lens* that will help you to build your project and give the rationale behind it.

- Annotated bibliography 1:

Your first annotated bibliography will include *five* sources, with a 200-word summary of each source. You will frame these sources with a brief (400-word) introduction of the main themes/topics commonly addressed by the sources, contrasting and comparing different approaches.

- Annotated bibliography 2:

Your second annotated bibliography will include *four* sources, with a 200-word summary of each source. It will also include *two* "design collections", a collection of 10-15 images of artifacts that address the same problem space as your project proposal. Each collection should be accompanied by a 150-word synthesis of how they address the same social issue as you. You will frame these sources with a brief (400-word) introduction of the main themes/topics commonly addressed by the sources, contrasting and comparing different approaches.

Presentations

Your presentations are important moments to discuss the progress you have made and show the work you've accomplished throughout the previous weeks. They hone your skills as a communicator, both visually and verbally, and are exercises in formal conversing with your peers during the Q&A. They should be supplemented with visual feedback (*at least* your required pin-up, to which you might add a PPT, a video, an interim poster, a sketch-up, a prototype, etc).

- <u>Presentation 1</u>:

Your first presentation will take place relatively early in the process. You are expected to articulate the take-away points from your project proposal, backed up with your sources from the first annotated bibliography (and beyond), and discuss your design "solution". The presentation should last 7 minutes, to be followed by 5 minutes Q&A.

- <u>Presentation 2</u>:

Your second presentation will take place after Spring Break and you will be expected to have made significant progress on your prototypes, having gathered feedback/conducted user-experience exercises with relevant stakeholder groups. You will be expected to discuss your progress, the user feedback gathered, and how this has informed your iterations (and/or will inform it in iterations to come). The presentation should last 7 minutes, to be followed by 5 minutes Q&A.

- <u>Final presentation</u>:

Your final presentation will take place on the last week of class. You will present your design and will be expected to discuss *how it responds to your problem space* not only through an explanation of the design aspect but also through a detailed discussion of the research you have done throughout the semester. The presentation should last 7 minutes, to be followed by 5 minutes Q&A. You should take the Q&A for this presentation particularly seriously, as it will provide significant insights for you to discuss in your final thesis.

Senior Thesis

There are five components to your final thesis. They are all graded out of 10. Their weighted average is worth 40% of your final grade. Weights are given below.

Literature Review and Introduction drafts

Each of these drafts is worth 5% of your "Senior Thesis" grade component. These drafts are meant to be works-in-progress. They are *mandatory* pieces to be handed in on the due dates to ensure that you are kept to schedule for the final thesis and *are graded differently* from your other pieces. They will be graded either as *0*, *6,* or *10*. If you *do not* hand in a draft, you will be given a 0. If your draft is clearly a slap-dash, last-second attempt to get something in, it will be awarded a *6*. If your piece of writing is clearly something that you have developed to be integrated into your final thesis document, you will receive a 10, and we will meet in class to discuss additional feedback, orally.

Final prototype

Your prototype is 10% of your "Senior Thesis" grade component. Your last prototype is the only one that will be graded. It will be graded according to how it reflects the process as you describe it in your thesis document and how it fits with your specific prototyping goals (also described in your thesis document).

Poster

The poster is worth 5% of your "Senior Thesis" grade component. This poster should effectively *visually* communicate your design through text, images, infographics, etc. It should provide information on the problem space you are working within and the research you have done to develop this final artifact.

Senior Thesis — the final document

Your Senior Thesis is worth 75% of your "Senior Thesis" grade component. The length of your final written thesis is approximately 6500 words, not including references, supplemented by visual support (pictures, sketches, etc). The thesis represents the written and theoretical record of the literature, methods, materials, process, and challenges that brought about the your problem space and your proposed solution. It must be well-written for a *professional and academic* audience, and must show, through its interlocking sections, how the social scientific literature researched by you identifies and analyzes a particular social or cultural issue, and how the design collections, design methods, and the your creative production attempts to address this issue. As such, it takes the hybrid format of half academic thesis/half design document.

The Thesis can be roughly broken down as follows (the lengths of each section are rough estimates and may vary depending on each project):

- Introduction (500 words):

The Introduction to your project that summarizes, without going into detail, the general problems that the group is addressing, and the critical design solution that communicates, challenges, or provokes users into understanding that problem in a new, different, or better way. It should contain some kind of "thesis statement" that, in only one or two sentences, encapsulates the most important part of your project.

- Literature Review (1500 words):

The Literature Review synthesizes peer-reviewed, academic literature into a compelling description of a problem space and provides the analytical frames that you will be using as a foundation for your design. The Literature Review should draw heavily upon the work done in your annotated bibliography. Examples of a successful Literature Review might be:
  - a tracing of several types of social, environmental, biological, and economic influences on the price of coffee, and an explanation of what Actor-Network Theory is and why it's useful for understanding the system of coffee production;
  - a description of the organizational and pedagogical structures and failures of engineering education, and the use of social-justice and engaged engineering pedagogical theory as a way to address engineering education;
  - the explanations of the kinds of neurological, social, and problem-solving advantages and disadvantages that autistic children have, and the use of the concept of neurodiversity to better understand and address mental illnesses.

- Design Process (2000 words):

The Design Process is a catch-all process section that describes the mechanical, practical ways the design was created (materials, processes, internal mechanisms, etc.), as well as documenting how the design changed from the initial sketches through the process of building

the prototype. Any setbacks, sudden changes, failures, and surprising successes *should be included* here as well.

The Design Process section should also contain user-testing reports of the design at various stages. Have friends, other groups, and instructors demo your designs as you create them, and document how users are using and interacting with your design in intended and unintended ways.

- Design Narrative (1500 words):

The design narrative is different from process. Whereas in process you discussed *how* you put the prototypes together, how they were tested, how they evolved, this one is meant to join the *theoretical* and *design* inspirations, providing a coherent explanation as why it is the way it is and how it addresses your problem space. In essence, the Design Narrative uses the design collection research and the work done in the theoretical section of the literature review to explain the goals of the your design artifact. The Design Narrative section should contain:
   • a description of the design (including polished, finalized sketches/imagery, and pictures of the final prototype),
   • a review of how it incorporates the theoretical and design inspiration research,
   • a discussion of how your design addresses the specific problem space identified, and therefore how it relates to the theme of social responsible research and design.

The Design Concept section should not contain any build or construction information that is not relevant to the *conceptual and formal* components of the design. For example, talking about the use of a spring mechanism in your object should only be discussed if the spring is integral to the formal, communicative, aesthetic component of the design.

- Next Steps (500 words):

After developing the material artifact, you will develop an organizational plan to bring the product to its target demographic. This includes detailing ideal construction materials, sourcing and pricing for those materials, environmental impact of the production process, regulatory concerns (including possible clashes with current policies), target audience statement and analysis, marketing and distribution strategies. Note that not all of the products designed will be easily promoted or integrated. If this is the case for your product, what are alternative, non- or alt- market distribution and production strategies that can be developed? If traditional advertising and marketing campaigns don't fit the product design, what are other ways in which you can reach out to and communicate with your target audience?

Supplies and Expected Costs

All texts for the course will be provided at no cost. Instead, you are expected to purchase materials for sketching, drafting, and prototyping. At a minimum, you will be spending money on the following:
   • A dedicated notebook/sketchbook and preferred drawing and sketching tools (I recommend that you also use it for notes from class so it's all concentrated in a single space for quick reference — I may ask to see your notebook in class);
   • Sketch paper for pin-ups;
   • Materials for prototypes;
   • Printing costs for end-of-semester glossy poster.

Course Policies

Attendance

Show up to class, I will be taking attendance every week! Excellence in submitted work will not make up for delinquency in attendance. More than two unexcused absences will result in a *lowering of your final course* grade by a full letter for each class missed beyond two. *Four unexcused absences will result in a failing grade*.

Excusable absences include illness, disability-related absences, family emergencies, and scheduled Rensselaer athletic events, but you must be *communicative* about these (you have my email and office phone number above)! If you were supposed to turn something in during a class you had an excused absence to, it must be turned in within 48 hours of the class that you missed.

Tardiness

You are expected to arrive promptly in class: I will take attendance at the beginning of class time. If you arrive late, *do not interrupt* conversations/discussions/lecture. Wait until studio time to come inform me that you have arrived so I can mark you as present.

Submitting assignments

See assignment breakdown for list of late penalties and general hand-in policies. If you have any questions*, email me well in advance*.

Academic integrity

The Rensselaer Handbook of Student Rights and Responsibilities and The Rensselaer Graduate Student Supplement define various forms of Academic Dishonesty and procedures for responding to them. All forms are violations of the trust between students and teachers. Student-teacher relationships are built on trust. For example, students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach, and teachers must trust that the assignments that students turn in are their own performance. Acts that violate this trust undermine the educational process.

The Rensselaer Handbook of Student Rights and Responsibilities and The Rensselaer Graduate Student Supplement define various forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student's own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration. Submission of any assignment that is in violation of this policy will result in a penalty. If found in violation of the academic honesty policy, students may be subject to two types of penalty. The instructor administers an academic [grade] penalty and the student is reported to the Dean of Students or the Dean of Graduate Education as appropriate. The first violation results in 0 grade for that assignment. The second violation results in failure of the course. If you have any questions concerning this policy before submitting an assignment, please ask for clarification.

Disabled students

Rensselaer Polytechnic Institute strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on a disability, please let me know immediately so that we can discuss your options. To establish reasonable accommodations, please register with The Office of Disability Services for Students. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. DSS contact information: dss@rpi.edu; 518-276-819; 4226 Academy Hall.

Term Calendar

Week	Lecture / Discussion	Reading	Assignment Due	Homework
Week 1 Jan 16	**Your Senior Project – Socially Responsible Research and Design**	Recommended handbook: Judith Bell (2014), *Doing your research project: a guide for first-time researchers*		Think about 3 possible projects that interest you to develop over the semester. Write a few sentences about why each one interests you. Bring them in for Week 2 discussion.
Week 2 Jan 23	**Starting a Project: thinking about responsible engagement and intervention**	- Swierstra & Jelsma (2006), *Responsibility without Moralism in Technoscientific Design Practice*		Do preliminary research on the project that captures your interest the most. Bring in for Week 3 *20 sources of interest* on the topic of different kinds (e.g. academic articles [see approved list], op-ed columns, a collection of images – at least one should be a peer-reviewed article).
Week 3 Jan 30	**Doing high-level academic research: recognizing and reading sources**	- Fals Borda (1993), *Power/Knowledge and Emancipation*	**Project Proposal**	Submit a 150-word summary of your project onto the LMS Forum, plus your list of sources. Respond to *at least two* other projects with feedback, comment on which sources they should consider using for their annotated bibliographies (and why), and contribute possible academic readings for your peers (draw from your other classes at RPI, particularly STS ones).

Week 4 Feb 6	**Learning from your bibliographical sources: Applying design to social research and vice-versa**	- Lenksjold et al. (2015), *Minor Design Activism: Prompting Change from Within*	**Annotated Bibliography 1**	
Week 5 Feb 13	**In-class presentations**		**Presentations and pin-ups 1**	Post your presentations on the LMS Forum. Respond to other presentations with brief comments and feedback on the project (choose different ones than previous forum interaction!).
Week 6 Feb 20	**Getting feedback: engaging responsibly with your audience**		**Prototype 1**	Post on the LMS Forum how you intend to reach out to your stakeholder group and how you will go about collecting feedback. Provide feedback for at least two of your peers.
Week 7 Feb 27	**Re-visiting your sources: recognizing relevant information and applying it to design**		**Annotated Bibliography 2**	
Week 8 Mar 6	Spring Break			
Week 9 Mar 13	**Your final thesis: tackling it head-on**		**Prototype 2**	**During Spring Break**: Post on the LMS Forum a brief comment on your progress in gathering feedback from your stakeholders. How did it go? Provide feedback for at least two of your peers.
Week 10 Mar 20	**Open Studio**		**Presentations and pin-ups 2**	Post your presentations on the LMS Forum. Respond to other presentations with brief comments and feedback on the project (choose different ones than previous forum interaction!).
Week 11 Mar 27	No Classes			

Week 12 April 3	**Open Studio**		**Literature Review (Draft)**	
Week 13 April 10	**Open Studio**		**Design Thesis Introduction (Draft)**	
Week 14 April 17	**Open Studio**			
Week 15 April 24	**Final Presentations**		**Final thesis due online, posters and prototypes due by 5pm in my office (April 29).**	Please fill out the course evaluations! They are incredibly useful for us, as instructors, to know where we can improve!

Notes:

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Appendix: Non-exhaustive list of approved peer-reviewed journals

Remember: these journals are not the only ones that you may use, but they're a good place to start. There is a difference between *journals* (e.g. Social Studies of Science), *publishers* (e.g. SAGE Publications), and *digital library platforms* (e.g. JSTOR). Digital library platforms/search engines, including GoogleScholar, ScienceDirect and JSTOR are useful places to start your research, often preferable to more common search engines (i.e. Google, Yahoo, etc).

- Engaging Science, Technology, and Society: http://estsjournal.org/
- IJESJP: https://ojs.library.queensu.ca/index.php/IJESJP
- Teknokultura: http://revistas.ucm.es/index.php/TEKN/about
- Science, Technology & Human Values: https://us.sagepub.com/en-us/nam/journal/science-technology-human-values - description
- Limn: http://limn.it
- Catalyst: Feminism, Theory, Technoscience: http://catalystjournal.org/ojs/index.php/catalyst/index
- Technology & Culture: https://www.press.jhu.edu/journals/technology-and-culture
- Cultural Anthropology: https://culanth.org
- Social Studies of Science: http://journals.sagepub.com/home/sss
- Public Understanding of Science: http://journals.sagepub.com/home/pus
- Science Communication: http://journals.sagepub.com/home/scx
- Bulletin of Science, Technology, and Society: http://journals.sagepub.com/home/bst
- New Media & Society: http://journals.sagepub.com/home/nms
- Science, Technology, and Society: http://journals.sagepub.com/home/sts
- Hau: Journal of Ethnographic Theory: https://www.haujournal.org
- First Monday: http://firstmonday.org/index
- Critical Sociology http://journals.sagepub.com/loi/crs
- Science as Culture http://www.tandfonline.com/toc/csac20/current
- Cultural Studies of Science Education http://www.springer.com/education+%26+language/science+education/journal/11422
- Any book or edited volume from a university press (Princeton, Minnesota, Chicago, MIT, etc. Please double-check with me if you are uncertain if a book is published by a university press).