UNIVERSITY OF NORTH DAKOTA
School of Electrical Engineering & Computer Science

STUDENT PROJECT GUIDE
FOR EE 480/CSCI 492/ CSCI 482

Version #	Date	Description	Prepared by
5	**06/13/2024**	**Fifth Version**	**Ertan Ozturk & John Nordlie**

Table list

0-Description

This guide contains a walkthrough for successfully completing a student design project proposal along with instructions for completing a project proposal reports and presentation. It also provides the rubrics by which each part of the project will be graded.

Note: Each report and presentation should contain a cover page including your project title, the name of the report/presentation, the list of team members of in your group, the code and title of the course and a submission date. The cover page format is given in Appendix 1.

Note: The codes in the below titles (AXx) defines the assessment number given in the course syllabus.

1-Initial Project Proposal

1.1 Initial Project Proposal Report (A4a)

Your initial proposal report should be two-three pages maximum, and will be graded on how well presented (i.e., well formatted) it is, as well as clarity and conciseness.

The body of the project proposal should contain the following parts:

- A concise summary of the *goals* of your project.
- An optional *background* section if you are continuing on from a previous capstone or if this would make the rest of the proposal clearer.
- Following this should be a section describing the potential contribution and advantages of your work to recent technology. Include why this is a challenging question worthy of a capstone project, and why it is important to its field of study (for example, why can you not just do this with off the shelf available software or device?). For design projects, discuss why this is important for the group, company or advisor the project is being developed with.
- The next section should be the *broader impacts* of your work. Describe the benefits to community, environment and society should your work be successful.
- The last section should be the *approach* to your work. Describe your strategy and methodology to accomplishing your proposed work by the end of the course, any open source as well as what 3rd party software packages and hardware you intend to use fort his.

This initial proposal report will be useful so you can get feedback on the feasibility of your project from your instructor and classmates during the proposal review classes.

Professional and proper presentation is important and will be part of your grade. The following rubric (Table-1) will be used by the instructor (and also your peers) to evaluate your initial project proposal (as well as other written components). Your grade for the project proposal and presentation will be the sum of your scores for each area divided by the maximum possible score.

Table 1 Initial Project Proposal Report Rubric

	3	**2**	**1**	**0**
Design or Scientific Merit	Proposal accurately describes the challenges behind the proposed work, and a compelling description of its importance. The challenges and importance are related to an accurate portrayal of the current state-of- the-art.	Challenges are well portrayed and the description of the works importance is mostly compelling.	Challenges are described, but may not be completely correct. Description of the works importance is given but not compelling.	Challenges are not described, or incorrect. Description of importance is lacking, or incorrect.
Broader Impacts	The proposal is well related to the current state-of-the-art, describing how its completion will be of benefit to its related field of study or project design company/advisor. It should be apparent that the ramifications of the work is well understood.	The proposal is related to some state-of-the-art work, and the ramifications of the work and its benefit to the field of study/advisor is partially understood and described.	Relation to start-of-the-art work may be incomplete or mostly missing. Ramifications of the work may be poorly understood. Benefits may be poorly described.	The proposal is incorrectly or not related to the state-of-the-art. Ramifications are incorrectly or not understood, and the benefits are not described or incorrect.
Approach	A well-reasoned and described strategy for the successful completion of the project is given. Candidates for third-party software/board and appropriate related algorithms are mentioned.	A strategy is presented for the successful completion of the project that demonstrates good knowledge of the problem at hand. Some candidates for third-party software/board and appropriate related algorithms are mentioned.	A strategy is presented for the completion of the project that demonstrates some knowledge of the problem. Few candidates for third-party software/board and appropriate related algorithms are mentioned.	A strategy is presented for the completion of the project that is incomplete or does not demonstrate knowledge of the problem. No candidates for third-party software/board and appropriate related algorithms are mentioned.

1.2 Initial Project Proposal Presentation (A3a)

Your project proposal presentation should take 10-15 minutes (including questions). Your proposal should be approximately 15 slides long, depending on content. The following criteria will be used for grading project proposal presentation.

Table 2 Oral Presentation Rubric

	3	2	1	0
Presentation	The speaker describes the related technical details and proposed strategy in a way that is easy for the common listener to understand.	Layperson listeners may not understand all the technical details or proposed strategy.	Very challenging for a layperson to understand.	Impossible for a layperson to understand.
Technical Quality	The speaker clearly presents any background material required for appropriate understanding in a manner easy to understand.	Informed listeners may understand background material with some applied effort.	Limited and minor to moderate incorrect presentation of background material.	Speech uses acronyms and other technical terms without discussion of what they mean. Background material not presented, or presented in a very minimal way.
References	Technical references are provided and referred to (along with strong explanation).	References are provided to required technical details, however discussion of this material might not be in depth or easily understandable.	Few technical references are provided for background information, and little attempt is made to discuss it.	References are entirely missing, glossed over or not possible to understand.

2- Related Work Survey and Project Planning Report (A4b)

This report consists of two parts, first Related Work Survey, then Project Planning. It shall start with the scope of document and with a short overview of your project.

The first part of this assignment requires your group to survey works related to your project. For each reviewed paper or related work, there should be at least a 1 paragraph description **written in your own words**. The referred paper should be cited within this paragraph. Quotes and block quotes can be used, but do not count towards the 1 paragraph description (you have to write something yourself). Depending on your group size, the related work survey should contain 3 to 9 related works.

Your related work survey should start with a paragraph (or two) introduction to the content of the survey, and should contain subsections requiring any background information that will be needed to understand your related works reviews. For example if there are commonly cited algorithms or software packages, these should be described here so the reader has background information about what your review is about.

Following the introduction, the next section should spend at least a paragraph discussing each of your related papers. What their approach was, what their significant results were, and any limitations or possible improvements to their work.

You should conclude your survey with a section describing **how your proposed work is different than the related work (i.e., you're not copying someone else)**, and why your approach is an improvement on what has already been done, or addresses a need that the other work does not. The following criteria will be used for grading your related work survey.

Table 3 Related Work Survey Rubric

	3	**2**	**1**	**0**
Citations and Related Work	All related work is well cited. Related work is well compared to the project and categorized to be easily understandable.	There may be some missing related work. Related work is partially compared to the project and partially categorized.	Related work is not well cited, with major omissions. Related work not well compared to the project nor well organized.	Related work is not cited at all.

The second part of this report shall include your project's Work Packets (WP) (e.g., WP-1: Project Management, WP-2 : GUI Development, WP-3: Application Software Development, WP-4: Hardware Development, WP-5: Testing and Validation, etc.). The technical content of WPs shall include visualization methods like block diagrams, flow charts, circuit schematics etc. The links among the Sub Works shall be defined. Responsible team member(s) for each WP and the responsibility of the team member(s) needs to be given in the report.

Besides, your report shall include your project schedule/timeline (Gant Chart) relating to Each WP, deliverables, project milestones, etc. This report will be graded by following the rubric in Table-4.

Table 4 Project Plan Rubric

	3	**2**	**1**	**0**
Work Packets (WP) planning	The WP of the project are well	The WP of the project are defined	The WP of the project are not	The WP of the project are not

	defined and well compatible with project proposal. The links between Sub works are correctly defined.	and partially compatible with project proposal. The links between Sub works are defined.	properly defined and not compatible with project proposal. The links between Sub works are not correctly (or not) defined.	defined.
Team member assignments to WP	The tasks of the project team in the work packages are correctly and well defined and the contribution rates is realistic.	The tasks of the project team in the work packages are defined and the contribution rates is partially realistic.	The tasks of the project team in the work packages are not well defined and the contribution rates is partially not realistic.	The tasks of the project team in the work packages are not defined.
Project Plan /Gant Chart	Project Schedule/timeline is well prepared, andwell compatible with project proposal. Deliverables and milestones are correctly given.	Project Schedule/timeline is prepared, and well partially compatible with project proposal. Deliverables and milestones are given.	Project Schedule/timeline is prepared, but not compatible with project proposal. Deliverables and milestones are not correctly given.	Project Schedule/timeline is not prepared.
Scope of Document	Perfectly given	Partially given	unrelated	Not given
Overview of the project	Perfectly given	Partially given	unrelated	Not given

3 Selected Related Work and Project Planning Presentation (A3b)

Part-I Brief Description of the project

Part-II (Selected Work): The presentation shall include 5-7 minutes review of one/two selected paper or piece of software/device mostly they reviewed for the related work survey. The presentation will be graded to follow a similar rubric to the proposal presentation (Table-2), however the aim of this presentation will be to inform the class about the paper or software/device reviewed so we all gain an understanding of it and how it works. Of particular importance is to give the presentation so that the audience leaves with a good understanding of the work. It is your responsibility to provide required background knowledge so that the audience can understand the work, using citations and references as needed.

Part-II (Project Planning): This part of the presentation shall be about the WPs of the project work including the descriptions of the tasks, time schedule, resources, and assigned team members (initial Gantt Chart).

For grading the Rubrics in Table-2, Table-3 and Table-4 will be used.

4 Creative Think Report (A1)

The template for the Creative Think report (CTR) is given in Appendix-2, and it shall be explained in the lecture.

5 Progress Reports (A4c)

You shall write 5 Progress Report throughout the Capstone-I course. Make sure to address the questions properly in the template of the progress reports given in Appendix-3.

Make sure to fill out the sections individually with enough explanations, avoid careless/haphazard writing. Then share your report with your project advisor(s) to grade the report and comment accordingly. It is your responsibility to follow up the submission of your progress report by your advisor to the instructor.

6 Team Module Report (A4d)

This is an individual assignment, not a team one. So, each student shall fill out and submit it individually. In the report, you shall evaluate your teammates. Make it clear, technical and professional. Give enough detail for each section, avoid careless writing. The template for the report is given as Appendix-4.

7 Refined Project Proposal (A4e)

Refined project proposal is the final report of your project proposal; hence it should include all your works for Senior Project-I course (EE 480/CSCI 492/CSSI 482) throughout the semester in a well-organized and logical manner. Please notice that you will execute your project during Senior Project-II course according to this refined project proposal; however, the refined project proposal may include some initial results of your project, but not final completed project result. For the organization of the refined project proposal, please see Appendix-5 as an example (Your report may have different organization).

In order to prepare your refined project proposal, you should update your initial project proposal, Project plan/Gant Chart and additional details pertaining to what you learned in your related work survey. You should identify the software, systems, algorithms and circuits/boards that you will utilize for your project, and present diagrams for clear understanding of the project proposal. In the case of research projects, you should differentiate your proposed work from what other people have done.

Make sure to present the current status of your work by using visualization methods like block diagrams, flow charts, circuit schematics etc. And try to point out and emphasis the technical challenges of your work and your main contribution relating to your CTR in your presentation. In short, your report should clearly indicate the frame, the high-level design of components (hardware, software or sub-system) along with interrelation to each other, and stating where is your creative (or your own) approach.

The criteria in Table 5 will be used for grading Refined Project Proposal.

Table 5 Refined Project Proposal Rubric

	3	**2**	**1**	**0**

Design/ Scientific Merit	Proposal accurately describes the challenges behind the proposed work, and a compelling description of its importance. The challenges and importance are related to an accurate portrayal of the current state-of-the- art or technology.	Challenges are well portrayed and the description of the works importance is mostly compelling.	Challenges are described, but may not be completely correct. Description of the works importance is given but not compelling.	Challenges are not described, or incorrect. Description of importance is lacking, or incorrect.
Broader Impacts	The proposal is well related to the current state-of-the-art, describing how its completion will be of benefit to its related field of study or project design company/advisor. It should be apparent that the ramifications of the work is well understood.	The proposal is related to some state-of-the-art work, and the ramifications of the work and its benefit to the field of study/advisor is partially understood and described.	Relation to start- of-the-art work may be incomplete or mostly missing. Ramifications of the work may be poorly understood. Benefits may be poorly described.	The proposal is incorrectly or not related to the state-of-the-art. Ramifications are incorrectly or not understood, and the benefits are not described or incorrect.
Citations and Related Work	All related work is well cited. Related work is well compared to the project and categorized to be easily understandable.	There may be some missing related work. Related work is partially compared to the project and partially categorized.	Related work is not well cited, with major omissions. Related work not well compared to the project nor well organized.	Related work is not cited at all.
Description	The proposal contains all required information to execute and successfully complete the project.	The proposal contains most of required information to execute and successfully complete the project.	The proposal is described weakly, The execution and successfully completing the project would be extremely difficult without significant additional work.	The execution and successfully completing the project would be impossible based in the information presented.
Diagrams	Technical diagrams are presented for complicated systems and workflows.	Technical diagrams are present but may be missing some aspects in terms of	Technical diagrams are poorly presented or partially incorrect.	Important technical diagrams are missing or incorrect.

		their presentation or they may not be fully explained in an easy-to- understand manner.		
Algorithms	Algorithms are presented in an easily readable format and thoroughly explained.	Algorithms are presented but may be missing some explanation or technical explanation.	Equations are missing, or partially incorrect. Explanations may leave much information missing or unexplained.	If algorithms are present, their explanation may be missing or incorrect.

8 Refined Project Proposal Presentation (A3c)

Your presentation should take 15 minutes (including questions), approximately 20-25 slides long, depending on content. This presentation will be the final presentation of your **project proposal**, so it is the presentation of your **Refined Project Proposal**, consequently at the end of your presentation, we will need to see some details of your project and may be some initial results, more importantly how you will execute your project in next semester during Senior Project-II with its feasibility. The rubric in Table-6 will be used by the instructor (and also your peers) to evaluate your presentation.

Table 6. Refined Project Proposal Presentation Rubric

	3	**2**	**1**	**0**
Presentation	The speaker describes the related technical detailsand proposed strategy in a way that is easy for the common listener to understand.	Layperson listeners may not understand all the technical details or proposed strategy.	Very challenging for a layperson to understand.	Impossible for a layperson to understand.
Technical Quality	The speaker clearly presents any background material required for appropriate understanding in a manner easy to understand.	Informed listeners may understand background material with some applied effort.	Limited and minor to moderate incorrect presentation of background material.	Speech uses acronyms and other technical terms without discussion of what they mean. Background material not presented, or presented in a very minimal way.

References	Technical references are provided and referred to (along with strong explanation).	References are provided to required technical details, however discussion of this material might not be in depth or easily understandable.	Few technical references are provided for background information, and little attempt is made to discuss it.	References are entirely missing, glossed over or not possible to understand.
Project execution plan	The speaker describes well how to execute to project proposal according to the project plan and project goal.	Description of how to execute the proposed project with relating to the project plan is defined, although there are some discrepancies.	The execution of the proposed project with relating to the project plan is poorly described.	The speaker does not provide how to execute the project with respect to the project plan.
Diagrams	Technical diagrams are well presented for complicated systems and workflows.	Technical diagrams are present but may be missing some aspects in terms of their presentation or they may not be fully explained in an easy-	Technical diagrams are poorly presented or partially incorrect.	Important technical diagrams are missing or incorrect.

9 Referring Sources/References in your text

In your reports, you shall properly cite your sources, e.g.," The physical layer (PHY) is the lowest one in the Open System Interconnect (OSI) model of computer and communication networks [7]. The authors in [8] studied the PHY layer security on Gaussian channels, and proved that expanding the difference ....."

The sources can be various: Patents, Journal papers Conference papers, Books, web sites, Dissertations, which are written differently in the Refence section (that is mostly at the end of the document). IEEE provides reference style sheet (Appendix-6) that is attached. So, you shall use it as a guide to write your reference section.

Appendixes

Appendix-1- Cover page format
Appendix-2 Creative Thinking Report Template (A1)
Appendix-3 Progress Reports (A4c)
Appendix-4 Team Module Report Template (A4d).
Appendix-5 Refined project proposal format (A4e)
Appendix-6 IEEE reference style sheet