

## EVALUATION CRITERIA FOR ECE 4810 PROJECT PROPOSALS (V10)

The following are a set of questions partially based on an ABET statement describing Engineering Design. **Students:** use the criteria as a guideline in preparing your proposals. **Advisors:** use the form to evaluate your team's proposal drafts by making appropriate entries. Please complete and return a copy to the ECE 4810 course coordinator. A proposal grade (A, BA, B, CB, C, DC, D, E) for each team member **is required only for the final draft.**

PROJECT TITLE \_\_\_\_\_ DRAFT No. 1 2 Final

TEAM MEMBERS AND (GRADES) \_\_\_\_\_ (\_\_\_\_);  
 \_\_\_\_\_ (\_\_\_\_); \_\_\_\_\_ (\_\_\_\_);  
 \_\_\_\_\_ (\_\_\_\_). ADVISOR \_\_\_\_\_ DATE \_\_\_\_\_

**I) Project need and description** (On graded **Yes/No** responses, please circle appropriate number if not clearly **Yes** or **No**)

- A) Does the proposal contain a clear and concise description of the project? **Yes** 10 9 8 7 6 5 4 3 2 1 0 **No** (circle)
- B) Is the need that the system, component or process is being devised to meet clearly and concisely stated?  
**Yes** 10 9 8 7 6 5 4 3 2 1 0 **No**

**II) Elements of the Design Process**

- A) Have appropriate qualitative and quantitative objectives and specifications been established and clearly stated for the system, component or process? **Yes** 10 9 8 7 6 5 4 3 2 1 0 **No**  
 If so: what proportion is quantitative? \_\_\_\_\_% what proportion is qualitative? \_\_\_\_\_%
- B) Has a **physical feasibility** study been completed? **Yes** 10 9 8 7 6 5 4 3 2 1 0 **No**  
 If so, was it primarily qualitative or quantitative? Qualitative \_\_\_\_\_ Quantitative \_\_\_\_\_
- C) Has an **economic** (dollar cost) **feasibility** study been performed? **Yes** \_\_\_\_\_ **No** \_\_\_\_\_  
 If so, was it primarily qualitative or quantitative? Qualitative \_\_\_\_\_ Quantitative \_\_\_\_\_
- D) Have mathematical and/or physical models and fundamental principles of engineering been used to transform the stated quantitative specifications into numerical values for the parameters of the system, component or process?  
**Yes** 10 9 8 7 6 5 4 3 2 1 0 **No**
- E) Were a number of **alternative solutions** developed, any or all of which might lead to a workable solution of the originally stated need?  
**Yes** 10 9 8 7 6 5 4 3 2 1 0 **No**  
 If so:  
 a) were the tentative solutions arrived at in primarily a quantitative or qualitative manner?  
 Qualitative \_\_\_\_\_ Quantitative \_\_\_\_\_  
 b) was the alternative that appeared most promising selected on the basis of primarily qualitative or quantitative factors?  
 Qualitative \_\_\_\_\_ Quantitative \_\_\_\_\_
- F) Estimate what proportion of the **design methods** used in the proposal were (see chapter 10 in Middendorf text):  
 a) **Device evolution** (trial and error, i.e. no formal engineering education required) \_\_\_\_\_%  
 b) **Repeated analysis** (design by iterating parameters in analytical models) \_\_\_\_\_%  
 c) **Synthesis** (direct solution of design parameters using mathematical models without iteration) \_\_\_\_\_%

G) Is there evidence that significant consideration was given to the following constraining factors and, if so, was the consideration based primarily on qualitative or quantitative factors? (please ✓) NA = not applicable

	NA	Yes	Maybe	No	Qualitative	Quantitative
a) economic	___	___	___	___	___	___
b) health & safety	___	___	___	___	___	___
c) environmental	___	___	___	___	___	___
d) sustainability	___	___	___	___	___	___
e) ethics	___	___	___	___	___	___
f) social impact	___	___	___	___	___	___
g) manufacturability	___	___	___	___	___	___
h) political	___	___	___	___	___	___

H) Is there evidence that a **literature survey** was performed? **Yes** 10 9 8 7 6 5 4 3 2 1 0 **No**

- If so: a) rate the apparent thoroughness of the survey from 0 (superficial) to 10 (exhaustive): 0 1 2 3 4 5 6 7 8 9 10  
 b) is each entry in the literature reference list cited at some point in the proposal? **Yes** \_\_\_\_\_ **No** \_\_\_\_\_

I) Is there evidence that a **patent search** was performed? Yes 10 9 8 7 6 5 4 3 2 1 0 No

If so: a) rate the apparent thoroughness of the survey from 0 (superficial) to 10 (exhaustive): 0 1 2 3 4 5 6 7 8 9 10  
b) is each entry in the patent search list cited at some point in the proposal? Yes\_\_\_\_\_ No\_\_\_\_\_

J) Does the proposal contain a **critical path network** for the project? Yes\_\_\_\_\_ No\_\_\_\_\_

If so, rate the apparent thoroughness of the network from 0 (superficial) to 10 (exhaustive): 0 1 2 3 4 5 6 7 8 9 10

K) Does the proposal contain a precedence **matrix** for the project? Yes\_\_\_\_\_ No\_\_\_\_\_

If so, rate the apparent thoroughness of the network from 0 (superficial) to 10 (exhaustive): 0 1 2 3 4 5 6 7 8 9 10

### III) Use of the ENGINEERING METHOD

A) Are the project's **specifications** clearly and obviously spelled out in the proposal? Yes 10 9 8 7 6 5 4 3 2 1 0 No

Is it clear which of the specifications are;

a) Requirements, which are b) Goals and which are c) Preferences? Yes 10 9 8 7 6 5 4 3 2 1 0 No

B) Is the **design concept** that was developed to meet these specifications clearly and readily identifiable? Yes 10 9 8 7 6 5 4 3 2 1 0 No

C) Were **physical and/or mathematical models** used to test the developed design concept? Yes 10 9 8 7 6 5 4 3 2 1 0 No

D) Is it clear that the testing via modeling unequivocally lead to the conclusion that the design concept would meet the originally stated specifications? Yes 10 9 8 7 6 5 4 3 2 1 0 No

### IV) Additional Factors

A) Were project **DELIVERABLES** including hardware items, software, manuals and software documentation listed in the proposal? Yes\_\_\_\_\_ No\_\_\_\_\_

If yes, rate the apparent thoroughness of the listing from 0 (superficial) to 10 (exhaustive): 0 1 2 3 4 5 6 7 8 9 10

B) The proposal contains a well defined and realistic plan for measuring the performance of the completed project and for comparing that performance with the original specifications. Yes 10 9 8 7 6 5 4 3 2 1 0 No

C) Have components to be used in the design (e.g. ICs, transistors, micro-processors, resistors, inductors, SCRs, LCDs, RAMs, PLDs, motors, actuators, sensors, transducers, PC boards, enclosures...) been selected and sized? Have circuit configurations been determined and have schematic circuit diagrams been drawn? Have drawings of mechanical parts been dimensioned? Have software flow charts been completed and has software been written where appropriate? (Note, all that should remain for ECE 4820 is implementation/building of the physical system, followed by testing and design revisions cycles.) Yes 10 9 8 7 6 5 4 3 2 1 0 No

D) Experience shows that design teams occasionally resort to a trial and error "design method" because of an alleged "lack of time" needed to identify the necessary models, synthesis techniques and engineering principles governing the technology in their project. By insisting that the ECE 4810 proposals explore and identify the models and engineering principles involved, the temptation of "trial and error" designing can possibly be diverted and at best completely avoided.

This proposal is strong enough to effectively avoid inappropriate "trial and error" designing (circle choice).

(**emphatically disagree**) 0 1 2 3 4 5 6 7 8 9 10 (**emphatically agree**)

E) Project's scope; (**too simple**) (**just right**) (**too ambitious**)  
(encircle choice) 0 1 2 3 4 5 6 7 8 9 10 9 8 7 6 5 4 3 2 1 0

F) Project's effect on student's ability to use engineering design methodology.

(**unnoticeable**) 0 1 2 3 4 5 6 7 8 9 10 (**extensive**)

G) Project's effect on the development of student's creativity.

(**unnoticeable**) 0 1 2 3 4 5 6 7 8 9 10 (**extensive**)

H) This draft of the proposal was submitted **ON TIME**. Yes\_\_\_\_\_ No\_\_\_\_\_