Instructions for ECE496 Projects
Welcome to ECE496!

This guide provides you with information to help you and your students get the most out of the design project course:

- a helpful calendar that guides you through the school year with key dates & deliverables for each month
- helpful tips on developing, managing, and evaluating your design projects
- An electronic version: Go to https://internal.ece.toronto.edu/ece496.1617/ (the “website”) and select Supervisors>Supervisor's Almanac

You are an Important Part of the ECE496 Instruction

Your students will require guidance and the occasional push in doing their ECE496 capstone design project. Since every project is different and every student team is different you will have to do different amounts and kinds of work depending on the situation. Deliverables submitted throughout the year are used to keep the students on track, working and learning.

The students will need guidance with technical and background information, and help with pacing and scheduling their project work in order to succeed while still tending to their other courses. We advise students to get as much help as they can from their supervisors, especially early on. However, we emphasize to students that it is ultimately their project and that they, not their supervisor, are accountable for it.

All comments and suggestions on the course and the Supervisor's Almanac are welcome!

Editors,
Khoman Phang
Phil Anderson
John Taglione
# Contents

Welcome to ECE496! ................................................................. 1
You are an Important Part of the ECE496 Instruction .................. 1
Events Calendar .......................................................................... 3
ECE496 At a Glance ................................................................. 6
Course Objectives ...................................................................... 6
Roles of supervisor, administrator, students .............................. 6
Course Grading Scheme and Deliverables ................................. 7
Changes for 2016-17 ................................................................. 7
Supervisor Marking Guidelines .................................................. 9
What the Administrator Does .................................................... 9
Stages of a project .................................................................... 10
Intellectual Property (IP) .......................................................... 10
Funding Support ....................................................................... 11
Managing your Design Projects ............................................... 12
Initial Meeting Checklist: .......................................................... 12
Workload Expectations ............................................................ 13
Looking ahead - Projects for Next Year .................................... 13
Finding Students and Project Registration ............................... 13
Project Categories ................................................................... 14
  Development projects .............................................................. 14
  Research projects .................................................................. 14
  Competition projects ............................................................. 14
Supervisor Rules and Regulations ............................................. 15
Signs of a good/bad project ...................................................... 15
  Signs of a good project: .......................................................... 15
  Signs of a bad project: ............................................................ 16
Other Resources ....................................................................... 16
ECE496 Weekly Progress Form ............................................... 17
## Events Calendar

<table>
<thead>
<tr>
<th>Summer</th>
<th>Checklist:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Start team on background research</td>
<td></td>
</tr>
<tr>
<td>□ Guide team with problem definition and project scope</td>
<td></td>
</tr>
</tbody>
</table>

Find your students and get them started on their project over the summer, so they can hit the ground running in September. One or two meetings over the summer will help keep the students motivated and on track.

References:
- Initial meeting checklist (page 13)

### Dates to Remember:
- Sept. 21 – Students submit Project Proposal (draft A) to Engineering Communication Centre
- Sept. 23 to Sept. 30 – Students meet with Engineering Communication Centre

### Checklist:
- Establish regular meetings
- Set team expectations, discuss your role as supervisor
- Sign **student-supervisor agreement** (see Students>Attachments Library on website)
- Guide students in preparing Project Proposal drafts

Early on, students need as much input as you can provide. Serve as the ‘expert client’ - test their background knowledge, question their assumptions, suggest resources, and provide feedback. You should meet weekly during this period.

References:
- Managing your Design projects (page 13)
- Initial meeting checklist (page 13)
- Signs of a good/bad project (page 16)
- Project Proposal Guidelines (see Students>Course Deliverables on website)

<table>
<thead>
<tr>
<th>September</th>
<th>Project Requirements</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>October</th>
<th>System Design</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dates to Remember:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 6 – Students submit Project Proposal (draft B)</td>
</tr>
<tr>
<td>Oct 20 (or thereabouts) – Students receive Project Proposal (draft B) back from Administrator</td>
</tr>
<tr>
<td>Oct. 27 - Students submit final version of Project Proposal</td>
</tr>
<tr>
<td>Oct. 31 to Nov 11 – Students hold a design review with Administrator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Checklist:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Explore design alternatives, finalize Project Proposal</td>
</tr>
<tr>
<td>□ Meet with team in preparation for Design Review</td>
</tr>
</tbody>
</table>

Help students finalize their project goal and requirements, work plan and explore initial design alternatives at the system concept level. All this work is documented in the final Project Proposal and defended at a Design Review Meeting between the group and administrator. The supervisor can attend.

References:
- Project Proposal Guidelines (see Students>Course Deliverables on website)
- Design Review Guidelines (see Students>Course Deliverables on website)
**November**

**Checklist:**
- Return Design Review/Project Proposal evaluation forms.

Evaluate your teams and give them feedback on their progress to date. Use the online report library to access to all your team’s previous reports. There are no more deliverables for the rest of the term. Regular meetings now focus on the detailed design work. Supervisors should keep track of progress using Weekly Progress form.

**References and resources:**
- Supervisor Marking guidelines (page 9)
- Reports and Evaluations area (available on website)
- Weekly Progress form (page 17)

**December**

**Checklist:**
- Meet with teams before the end of term to go over goals for the holiday period
- Discuss what students should include in their Progress Reports

Teams often take advantage of the holidays to work on their projects. Help your teams set goals for this period and review them again at the next meeting after the holidays. (Unmarked) meetings with Administrators for progress review.

**January**

**Dates to Remember:**
- Jan 17 – Students submit Individual Progress Report
- By Jan 31 – Supervisors submit progress marks for individual students
- Mid-Jan to late March - Students give Oral Presentations on Tuesday or Thursday evenings (supervisors can attend).

**Checklist:**
- Re-schedule regular meetings for this semester
- Progress marks submitted
- Review team’s progress since last meeting
- Guide students in preparing their Progress Reports and Oral Presentations
- Supervisors begin developing projects for next year

Meet with your groups to get an update on their progress. Encourage them to concentrate on their design projects now, before they are swamped by work in other courses. The frequency of subsequent meetings will probably fall (say to alternate weeks) since the implementation is ongoing, but encourage your students to contact you sooner when problems arise. You may want to insist on weekly progress reports even though you are not meeting with the students. Meet with individuals if you suspect imbalances in the loading or efforts, or if there appear to be problems (technical or personal) where individual help is indicated.

**References:**
- Managing your Design projects (page 12)
- Weekly Progress Form (page 17)
- Progress Report Guidelines (Students > Course Deliverables on website)
- Oral Presentation Guidelines (Students > Course Deliverables on website)
- Looking Ahead - Projects for next year (page 15)
- ECE496 Project Listings (Projects > Project Listings on website)
<table>
<thead>
<tr>
<th>February</th>
<th>System Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Checklist:</strong></td>
<td></td>
</tr>
<tr>
<td>□ Discuss what final results to present in the final report and at the Design Fair</td>
<td></td>
</tr>
<tr>
<td>□ Reminder: submit design project descriptions for next year</td>
<td></td>
</tr>
</tbody>
</table>

Now is the crucial time for your teams to plan their final demonstration at the Design Fair and for you to clarify how your teams should document their project work in the final report. In terms of design, the teams should be completing and testing the modules in their design and starting system integration, testing, and verification.

**References:**
- Design Fair Guidelines (*Students > Course Deliverables* on website)
- Looking Ahead - Projects for next year (page 13)

<table>
<thead>
<tr>
<th>March/April</th>
<th>Final Testing / Wrap-up</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dates to Remember:</strong></td>
<td></td>
</tr>
<tr>
<td>• March 23 – Students submit Final Report</td>
<td></td>
</tr>
<tr>
<td>• April 4 to 6 – Annual Design Fair</td>
<td></td>
</tr>
<tr>
<td>• April 7 – Design Showcase</td>
<td></td>
</tr>
</tbody>
</table>

**Checklist:**
- □ Guide writing of final reports
- □ Guide students in preparing their Design Fair poster
- □ Final reminder: submit design project descriptions for next year
- □ Submit final student evaluations
- □ Come out to the Design Fair and support your teams
- □ Sign up students for next year’s projects

This year's students are completing the technical work of the project. Emphasis should be placed on system testing and in relating these final results to the initial goals and requirements of the project.

*Come to the Design Fair and help judge this year's graduating class. Awards and invitations to external design conferences will be determined from your feedback.*

*Supervisors can evaluate the final demonstration at the Design Fair or in a separate meeting with their teams.*

*Sign up students for next year's projects before everyone breaks for the summer. Reward yourself for a job well done. Take a deep breath - it's all about to begin again!*

**References:**
- Finding Students and Project Registration (page 13)
- Final Report Guidelines (*Students > Course Deliverables* on website)
- Design Fair Guidelines (*Students > Course Deliverables* on website)
ECE496 At a Glance

ECE496 is a full-year, capstone design project course intended to give students an opportunity to apply and to grow their technical knowledge and project skills. Working in teams of two to four students, under the direct supervision of a faculty member, students develop a design project of their choice from an initial concept to a final working prototype. Course deliverables are evaluated by both the team's supervisor and one of the course administrators. Group work and individual work is used in determining the final course grade.

Course Objectives

- Use of and extension of technical knowledge
- Handling of larger projects (system engineering skills)
- Practice of technical communication skills prior to entering industry
- Work with reduced supervision / work in teams / self-starting
- Opportunity to work more closely with faculty
- Assessment of skills prior to grad school or work
- Exercise of requirements tractability from initial concept to final product/process and verification / validation

Roles of supervisor, administrator, students

The entire design process for each student team is overseen by both a project supervisor and a section administrators. The project supervisor is a faculty member who works most closely with the students and provides mentoring, technical support and guidance. The section administrator, on the other hand, is mainly responsible for the grading of reports and presentations. The administrator also ensures that an appropriate design method and work plan is put in place and followed, and ensures that all teams are graded in a consistent and impartial manner.

Figure 1 below shows the complementary roles of the supervisor and administrator. This arrangement provides a means of checks and balances: problems are identified and a mechanism is in place for resolving conflicts.

When discussing the various roles to your students, encourage them to compare themselves to a hired team of consultants. Their customer is the 'expert client', their supervisor, who has specified the design problem and is looking for a solution. The Administrator is the team's manager responsible for verifying that milestones are met, and evaluating whether the results delivered by the team satisfy the project requirements as initially laid out by the client and team.

As the 'expert client', the supervisor has a good deal of background and understanding of the problem. Supervisors are a valuable source of information, but it is the responsibility of the team to actively engage their supervisor and to meet with him/her regularly. While the supervisor typically has a clear idea of the desired outcome and the scope of the project, ultimately, it is the team that must determine what they can realistically deliver and the goals and scope of the project. It is the team, not the supervisor that will be held accountable.
Course Grading Scheme and Deliverables

Table 1 shows the grading scheme. The three key milestones that mark the START, MIDDLE, and END of the project are the Design Review, Progress Report, and Design Fair. Supervisors evaluate their students at each of these milestones. The course deliverables support these milestones and are representative of the deliverables required out in industry and are described in Table 2. The final grade is equally weighted between the Supervisor and the Administrator.

Changes for 2016-17

- Marking will be online on an extension of the registration/report submission website, and linked closely to the Graduate Attributes being tracked by the faculty.

Figure 1: Student, supervisor, and administrator roles.
### Table 1: ECE496 Course Grading Scheme

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Deliverables</th>
<th>Weighting</th>
<th>Supervisor Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Review</td>
<td>Project Proposal</td>
<td>10% Admin-</td>
<td>Performance to date evaluated by submitting a combined grade to cover the project proposal and design review. Different marks can be assigned to each student.</td>
</tr>
<tr>
<td>(START)</td>
<td>Design Review meeting</td>
<td>8% Admin-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5% Supervisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15% Total</td>
<td></td>
</tr>
<tr>
<td>Progress Report</td>
<td>December Review</td>
<td></td>
<td>Unmarked early review of progress to make sure students are well-started.</td>
</tr>
<tr>
<td>(MIDDLE)</td>
<td>Individual Progress</td>
<td>10%</td>
<td>Interim performance evaluated by submitting an individual mark for each student. Supervisor does not mark oral presentation, but may attend.</td>
</tr>
<tr>
<td></td>
<td>Evaluation</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Individual Progress</td>
<td>7%</td>
<td>Interim performance evaluated by submitting an individual mark for each student. Supervisor does not mark oral presentation, but may attend.</td>
</tr>
<tr>
<td></td>
<td>Report</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group Oral Presentation</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Design Fair</td>
<td>Final Report</td>
<td>5% Admin-</td>
<td>Final performance evaluated by submitting a combined grade to cover the Final Report and the Design Fair. Different marks can be assigned to each student.</td>
</tr>
<tr>
<td>(END)</td>
<td>Design Fair</td>
<td>10% Admin-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10% Supervisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20% Total</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>50% Admin-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% Supervisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100% Total</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2: Marked Deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Deliverable Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Proposal</td>
<td><em>The main project planning document. Outlines the project, its motivation, the initial system design, and work plan. Students submit two earlier drafts to get comments from their Administrator (draft A) and from the Engineering Communication Centre (draft B), and defend their final version at the design review meeting (see below).</em></td>
</tr>
<tr>
<td>Design Review</td>
<td><em>Students defend their Project Proposal in a group meeting with their Administrator. Supervisors can attend.</em></td>
</tr>
<tr>
<td>Individual Progress Report</td>
<td><em>One interim report from each student to document their progress to date. Note: Supervisor marks should be in early for best effect.</em></td>
</tr>
<tr>
<td>Oral Presentation</td>
<td><em>A short oral presentation given by the team to the Administrator and to other students. The supervisor is invited to attend.</em></td>
</tr>
<tr>
<td>Final Report</td>
<td><em>A final document of the group’s work and final results.</em></td>
</tr>
<tr>
<td>Design Fair and Demo</td>
<td><em>A poster presentation and final demonstration of their completed project.</em></td>
</tr>
</tbody>
</table>
Supervisor Marking Guidelines

- Your role as the supervisor is to evaluate the knowledge, skills, and effort of your team, their effectiveness as a group, and the significance of their technical achievements.

- **Supervisors are in the best position to evaluate:**
  - mastery of technical knowledge
  - accuracy of technical details
  - the individual efforts and contributions of students

- You may or may want to wait for the administrator’s marks before delivering your own. The exception to this is the progress reports in January where we urge you to deliver the marks quickly so that the students have time to adjust before end of term.

What the Administrator Does

- The Administrator is the one responsible for providing a detailed evaluation of each report. Since each administrator oversees about 10-15 design project teams, the Administrators are in the best position to ensure that all projects are marked consistently and fairly. As such, the Administrator's mark is meant to represent an impartial, consistent, relative measure of a group's work in comparison to other project groups. As such, the Administrator's mark should be used by the supervisor as a benchmark for his/her own evaluation, recognizing that the Administrator's perspective of the project is limited to that provided by the course deliverables.

- The Administrator is not marking the worth of the subject area, but of the execution of the project. Sometimes student’s will not properly reflect their work in the submitted material, and sometimes will inflate their work in the submitted material. It is very important that the Supervisor be alert to these circumstances and mark according to the actual worth of the work done.
**Stages of a project**

There are various methods of planning used in industry. At the root of all of these is a “determine what needs to be done”-“design what needs to be done”-“do what needs to be done” loop. This is the basic Waterfall Model, even though this is not used in practice in the form it once was. It can be used once, as it is in some projects, or iteratively. If the students encounter problems, or change course during development, it is expected that the original plan may/will be revised.

Regardless of what method is used, your students MUST produce an all-over plan. “Start in September and see where we get” is not a plan and student marks will suffer dearly if this is what they propose. There is almost no penalty for defendable plans that prove faulty because of miscalculations or unanticipated events. Being able to plan and to schedule time and effort is part of the learning of this course.

The students already have experience in setting up a project in first year: APS111 and APS112. They have learned to determine requirements, find a solution set, and select a single solution for execution.

The default method we propose is shown in Figure 2. It starts with a general goal and then moves to requirement development. A 'System Design' is next proposed to fit the requirements. The parts of the System Design are individually detailed, synthesized and tested, then the modules are combined and tested as a whole. This flow is shown with the solid gray arrows in the figure.

There should be tractability of requirements through the process as shown by the dashed arrows, and that all stated requirements must be tested and verified in the final product. Such tests can be 'pass/fail' in nature or can be a measure the performance of the final design to be compared to a target specification. Descriptions such 'user friendly', 'high gain', etc. are imprecise, subjective, and can not be verified, and are, therefore, not good requirements, unless further clarified.

Please see later sections on how “research” and “competition” projects fit this model.

**Intellectual Property (IP)**

In practice, design projects rarely develop to a degree where IP becomes an issue. In general, however, it is best not to do any project where IP is to be protected.

If you have IP that must be protected, such as technology you or the students wish to maintain control of or patent, please contact your Administrator before proceeding. Likewise, the students and supervisors should not sign agreements with any participating or contributing company or group without first getting the go-ahead from the University. Intellectual Property contributed by the Company remains the company's. Anything developed during the project may be controlled by the University if university resources contributed to the project.

For more information about Intellectual Property, go the course website under ‘Students’ -> ‘Intellectual Property’.
Students are expected to contribute up to $100 each towards the project. This amount does not include what they might spend for the presentations, such as the poster at the design fair. Projects are available that require no funding by students.

Other sources of funding and resources include:
- Industrial sponsors
- Supervisors who contribute out of their own funds, particularly where the student projects will aid their research.
- The ECE Department Design Project Fund. Students apply for this funding around the time of the Design Review.
- Equipment available through the Design Centre, SFB520 (best to visit the Centre to determine what resources are currently available)

For more information about funding resources, go the course website under ‘Students’ -> ‘Budget and Funding’.

**Figure 2 Model for Project Development**
Managing your Design Projects

Effective supervision relies on communicating five key elements:

<table>
<thead>
<tr>
<th>Desired Results</th>
<th>Guidelines</th>
<th>Resources</th>
<th>Accountability</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree upon the mutual expectations of the project and its desired results. Focus on results, not methods.</td>
<td>Specify the parameters within which the results are to be accomplished.</td>
<td>Identify the human, financial, and technical resources available to them for the project.</td>
<td>Make clear your expectations and the standards you will hold them accountable to when you evaluate their work (e.g. time, effort, milestones).</td>
<td>Apart from the obvious course grade, discuss the technical significance the project if it is successful. Stress the importance of learning to work in a team, and the importance of getting strong references from both the supervisor and administrator. At this stage in their career, it's not about marks; it's about making a marked contribution and demonstrating their unique abilities.</td>
</tr>
</tbody>
</table>

Initial Meeting Checklist:

- Establish regular meetings to keep them on track. We suggest weekly until the proposal is submitted and bi-weekly after.
- Have students come prepared to meetings. It is helpful to establish a set of action items at each meeting and to review them for the next meeting. You can have your teams complete a weekly progress form such as the one provided on page 19.
- Encourage the use of engineering design notebooks to keep notes on contacts, design decisions and background references and information.
- Have your students describe their vision of the final demonstration at the Design Fair. Visualizing a goal will helps orient their activities on the project so the student's work is shown in the best light, even if it means cutting back on the scope of the project.
- Get your team off to an early start. Here are some tasks that can be started right away (ideally over the summer):
  - Literature search
  - Market/user survey
  - Background skills: learn key software tools, hardware components, test equipment, etc.
  - Brainstorming project ideas and applications
Workload Expectations
The ECE496 design project is one of five courses in each semester. As such, students are expected to consistently spend about a full day a week on it. Over the school year, this represents over 500 hours for a team of three and around 300 hours for a team of two. Some of this will be time spent with you as a supervisor, some will be spent in background research and learning, some will be spent drawing together the details of the project into the reports. You should also expect them to work less on the project over midterm and exam periods, but correspondingly more at other times.

Selecting a project that will exactly meet this time commitment is impossible, but you can get close. As the project gets detailed, make sure the amount of work is realistic.

- Allow at least 1/3 of the time for communication activity
- Allow time to try out technologies new to the students before they actually apply them to the project
- Allow delivery time for parts
- Allow at least a month for system integration and complete testing before the final date
- Allow time for mistakes and rework

Looking ahead - Projects for Next Year
In January / February we will send out a call for design projects. Your responses will be posted on the ‘Project Listings’ page of the course website. Eventually, we want to expand the project listings also include projects proposed by students, industry, and other researchers or institutions.

Finding Students and Project Registration
Students interested in having you as their supervisor will approach you directly.

While commendable, we generally do not recommend supervisors take on more than their required 6 students. If you find that a group of yours is struggling, try to help by providing more guidance. Mentoring takes time so we do not want to burden you with too many design groups.

The project registration instructions are available on the course website. From the Main page, select 'Registration'
Project Categories
Projects can be proposed by either the supervisor or by the students. Projects provided by the supervisors can draw from their research interests (both old and new) and from their collaborations with industry or other researchers.

Projects can be further divided into the following categories that are described below:
- Development projects
- Research projects
- Competition projects

Development projects
These projects involve the development of a new device or process. These work very well when they involve a new combination of technologies or the use of a new technology. This almost guarantees the design decisions that are important to this course. The target might already exist in some form, but as long as the project is not a duplicate technologically, the result will still be worthwhile.

Research projects
Research projects can be done as ECE496 projects but require special handling by the supervisor. Care must be taken to prevent the project from being too open-ended. The outcome of the project must also be measurable or verifiable.
For example, the project could be the development of a switched-mode power supply using a new control law. Such things as power efficiency are the measurable attributes of the research. The project is then the setup and control of the experiment(s) to measure this (and other) parameters. Certain controls must be in place to make the research valid: For example, the input power source must be within certain limits and the switching frequency must be maintained within certain bounds. The inputs and frequency are what can be measured - they are the controls of the experiment, and these are what must be described in the project requirements. The actual control law, power efficiency, ripple, and so on are the unknown attributes of the design to be determined by the research. They should be identified at the start of the project. A test procedure would be an excellent way of presenting together the requirements, controls and determinations in the first few deliverables.

Competition projects
Here, multiple teams compete against one another in a contest. Usually, the supervisor specifies the parameters and constraints of the competition and the criteria used for judging. Note that the evaluation of these projects for ECE496 will be based on the merits of the actual design and the design method used, and is independent of the results of the competition. Typically, however, the projects where careful thought goes into the initial requirements perform well against others where this is not the case.

Competitive projects can work well and can be very enjoyable for the students, but must be carefully staged to fit the course structure. Each team must set out a list of requirements of their
competition entry. For example, they might specify that their entry would not tip over when subjected to a force of xx Newtons, and that the entry would be able to do a 360 degree circle in under a 1 meter diameter. The features of the entry must not be developed on an ad hoc basis and must be made to meet verifiable and quantified targets. As with any project, a certain amount of change in specifications is acceptable given adequate justification.

Sometimes, a supervisor wishes to take on multiple groups interested in the same project. This does not necessarily imply a competition, since one can run several instances of the same project with slight variations. For example, a different emphasis on portability, cost and product lifetime could result in three very different designs with the same general goal. Since the measurement of success is different in each case, there is no competition per se, and each variation can be considered a separate development project.

**Signs of a good/bad project**

**Signs of a good project:**

- a clearly defined starting point and ending point
- measures of success definable from the start (functions to be implemented, verifiable/measurable characteristics)
- some independent self-learning required (not just a straight-forward implementation of existing knowledge)
- not swamped by self-learning (with a summer start, students should have a basic understanding by the end of September, and a working knowledge by middle of the fall term)
- complex enough to involve all the students in the team for the entire design cycle

**Supervisor Rules and Regulations**

1. Each faculty member with a full-time appointment in the department is required to supervise 6 undergraduate students for design projects or an Engineering Science thesis. Design projects offered by the faculty and by other departments are also counted towards undergraduate student supervision. Partial teaching appointments will be required to supervise a pro-rated number of students.

2. The academic record of a student must not be used as a criterion for accepting or rejecting students. All students are required to complete a design project, and we have a collective responsibility to provide supervision.

3. A faculty member is not required to supervise a design project while on a research leave. Please let us know (at ask496@eecg.utoronto.ca) if you have a special arrangement with the department or are going to be on sabbatical the coming school year. Faculty members who choose to split their leave over two years should arrange to supervise a project in one of the two years.

4. The administrators responsible for the ECE 496 course have the responsibility to assign students to those supervisors who have not accepted their minimum quota of students. The course administrators will attempt to match interests whenever possible and to balance the load. This process will take place starting in late August.
- complex enough to require significant design decisions and trade-offs by the team
- simple enough to be manageable in the one-year timeframe
- Clear project results. Examples: a new device, software program, process, engineering model

**Signs of a bad project:**
- too open-ended and/or without a clear purpose (e.g. 'play with a new technology and see what happens')
- too simple (e.g. create a personal website)
- too complex (e.g. requiring the entire year to get up to speed on the theory or technology, or having an excessively long development time)
- lacks design content. Examples: a paper survey, a simple website, a manufacturing project where it is essentially a technician’s job involving no uncertainty or creativity.
- a conglomeration of several projects (e.g. a project that is no more than a sequence of multiple, trivial, smaller projects)
- tied to very limited resources (e.g. a medical scanner that is only available once a month for 1 hour)
- tied to components that have very long lead time or an uncertain supply

**Other Resources**

ECE496 course website: [http://int.ece.utoronto.ca/ece496.1617](http://int.ece.utoronto.ca/ece496.1617) the key source of all information relating to the design project. This site also includes the link to the Online Reports and Evaluations Library where supervisors can see the reports.

The Administrators
Working with the Administrators, particularly if there are problems with a project or its execution, or any aspect of the marking, will make it easier on all of us. The course is still changing to make the student experience better and the Supervisor / Administrator workload less.

The Design Centre
The Design Centre is located in the basement of the Sandford Fleming building in room SFB520 and is equipped with a full range of electronic equipment, computers, and design software tools. No classes are scheduled in this room so students have complete freedom to work on lab and final year design projects.
# ECE496 Weekly Progress Form

<table>
<thead>
<tr>
<th>Date</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Team:  

## Last Meeting

<table>
<thead>
<tr>
<th>Activity</th>
<th>Member Responsible</th>
<th>Due</th>
<th>% done</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## This Meeting

<table>
<thead>
<tr>
<th>Activity</th>
<th>Member Responsible</th>
<th>Due</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Comments / Concerns