American University of Beirut
Faculty of Engineering & Architecture
Electrical and Computer Engineering Department

EECE 501 Final Year Project (FYP)
Guidelines and Procedures

Fall 2011-2012

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1 Introduction

Students are responsible for the content of this document.

1.1 Why have a Final Year Project (a.k.a. MAJOR DESIGN EXPERIENCE)

The Final Year Project (FYP) is more about you than the project. This is the LAST opportunity for you to establish your technical confidence. This starts by you identifying a problem for which the solution is not obvious or clear in your mind. Then, as a team, formally formulate the problem and its constraints then develop THE design and implementation, which you assess to demonstrate that the design meets your constraints. Hopefully, out of this experience you come out more confident of your engineering capabilities and skills. This is your opportunity to convince us, your future employer and yourself (more importantly) that you can systematically solve a non-trivial problem and formally assess your solution (more importantly).

In addition, the FYP is important for a number of reasons:

1. An opportunity to improve your teamwork and communication skills
2. An opportunity to be involved in multidisciplinary research
3. It allows you to specialize further in a topic of interest
4. It is the work that prospective employers will most likely ask about during a job interview
5. It is an opportunity to closely work with and receive career advice from a faculty member

Your responsibility to do a good job extends beyond yourself to your project team, your advisor, FEA, and the University; continuing a legacy of hundreds of outstanding projects and teams that have given AUB and FEA a national and regional reputation of excellence.

Engineering is both a theoretical and an empirical, hands-on discipline. There are many skills that simply cannot be taught in the classroom. They can only be learned through practical experience - that is, working on a large design project that exposes you to:

- **The real world of engineering**: The primary goal of the FYP is to transform you into an engineer who understands and can do all that is required to do an excellent job: meeting deadlines, overcoming obstacles, communicating effectively, and producing a high quality project result and report. You will need to use all that you have learned at AUB, put in the required effort, and follow the guidance given to you by those who are interested in your success. This course will prepare you for the rigors of the real world of engineering better than any other course.

- **Knowledge Integration**: The FYP will require you to integrate and use various streams of knowledge and skills you have acquired in various courses, fields, and disciplines.

- **Engineering Approach**: A good FYP starts with the formulation of a problem, then suggests alternative solutions, and finally implements one of them. Learning and experimentation through building partial and full prototypes is a common task in this approach. In a one semester class there is rarely enough time to perform all required research, analysis, and prototyping. However, for the FYP you will have this opportunity to carry out a full design project over two semesters.

- **Teamwork**: The FYP requires that you work effectively as part of a design team. You will work in teams of typically 3-4 students. As a team you will be responsible for dividing up the tasks, monitoring the each other’s work, and integrating individual efforts into a single package. In the “real world” products/designs are rarely, if ever, developed alone. Learning to be an effective member of a design development team is an important set of skills to acquire.
- **Specialized roles on a team**: The FYP will allow you to deepen your knowledge and specialize in an area/topic of your choice and in which you can challenge and improve yourself.

- **Communication Skills**: The FYP will require you to practice your writing and oral presentation skills. These skills will undoubtedly improve through the process. Two fundamentally important parts of the project are the written documents you will produce and the oral presentations you will give.

### 1.2 ABET Accreditation and FYP

The FYP is designed to satisfy the program outcomes of engineering curriculum required for accreditation by the Accreditation Board for Engineering and Technology (ABET). Meeting ABET requirements is important to keeping AUB and FEA at the forefront of engineering education. This gives international recognition to the standards met by those earning an AUB Bachelor of Engineering Degree. (The AUB BE degrees awarded in Computer and Communications Engineering (CCE), Electrical and Computer Engineering (ECE), Civil and Environmental Engineering (CEE), and Mechanical Engineering have been accredited by ABET since October 2008.)

ABET Criterion 5:

- **Engineering design** is the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet these stated needs.
- Students must be prepared for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.

**ABET Program Outcomes:**

(a) an ability to apply knowledge of mathematics, science, and engineering  
(b) an ability to design and conduct experiments, as well as to analyze and interpret data  
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability  
(d) an ability to function on multi-disciplinary teams  
(e) an ability to identify, formulate, and solve engineering problems  
(f) an understanding of professional and ethical responsibility  
(g) an ability to communicate effectively  
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context  
(i) a recognition of the need for, and an ability to engage in life-long learning  
(j) a knowledge of contemporary issues  
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
FYP Student Learning Outcomes:

(a) an ability to apply knowledge of mathematics, science, and engineering  
(b) an ability to design and conduct experiments, as well as to analyze and interpret data  
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability  
(d) an ability to function on multi-disciplinary teams  
(e) an ability to identify, formulate, and solve engineering problems  
(f) an understanding of professional and ethical responsibility  
(g) an ability to communicate effectively  
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context  
(i) a recognition of the need for, and an ability to engage in life-long learning  
(j) a knowledge of contemporary issues  
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

1.3 The Purpose of this Manual

The purpose of this manual is to provide a consolidated source of information to help you get started on a path that will lead to the successful completion of your final year project requirements. This is not a textbook, each project is different, depending on the design situation and problem you and your team will face.

Early topics include procedures for initiating or proposing a project, followed by guidelines for your first report and oral presentation, and successive requirements and deliverables.

The main requirements of FYP are similar across the departments thus students are encouraged to form teams or undertake projects that require the participation of members from outside their major discipline. Tackling a design problem by working with individuals who have a different perspective can increase the possibility of innovative and creative solutions. The Dean and faculty in the FEA wish to encourage and support students who opt to take on multidisciplinary final year projects.

See the Fall Calendar and Schedule for a complete list of course events and deadlines for this semester. Good luck, and if you have any questions that are not answered in this manual please contact your FYP coordinator.
2 Group Formation and FYP Selection

The selection of an FYP is a very important decision and should be made carefully. Project ideas can be proposed by students or faculty members. If you are proposing a project, have your group contact a faculty member asap. A faculty member must be willing to adopt the project and supervise it. The group formation and project selection process is managed online at http://webfea.fea.aub.edu.lb/fyp2.

- **By First Day of Classes**
  - Project proposals are posted. These proposals are described using Project Description and Agreement Form. This form, shown in the appendix and posted on Moodle, is required to allow the faculty member proposing the project and the course coordinator to assess its adequacy as a final year project constituting a MAJOR DESIGN experience. It also provides student teams with detailed information and expectations for the project. **You will be required to update this form throughout the FYP process.**
    - If your group is proposing a project contact a faculty advisor asap. Consider the research interests of each faculty member.
- **By End of First Week of Classes**
  - Student groups are formed. You have the liberty of choosing your group members. If you are having difficulty finding a group contact FYP coordinator asap. **Ultimately it is your responsibility to be in a group.** Groups are formed of three students except in very special cases where the advisor is indicating the need for a group of four. Make sure you enter your group online.
  - During this week, we recommend groups meet with faculty members who proposed projects. It is more likely for an advisor to choose a group that already discussed the project with them.
  - Groups select a project. Make sure you discuss the project with all group members and get their consensus on it before you select it online.
  - You are welcome to accelerate the process and choose a project before the end of the week to gain time.
- **By the Beginning of Second Week of Classes**
  - Faculty members will accept groups that selected their projects. Faculty members will be encouraged to make the selections as soon as possible.
  - Students need to be aware that there is a limit to how many projects a faculty member can supervise. If there is particular interest in working with a specific professor in a particular area and that faculty member has a full quota, students may consult with the FYP coordinator who will point them to another professor who may be willing to supervise your project.
- **For Students who were not Assigned Projects**
  - Another round of selection is repeated during the second week of classes.
- **At the Beginning of Third Week of Classes**
  - Forced allocation of projects is done by the FYP Coordinator
  - Students who are unable to find an advisor will have to check with the FYP coordinator to see those professors whose quota has not been filled yet and agree on a topic with one of them.

*Do not hesitate to contact the FYP Coordinator if you have any questions or problems!*

2.1 A Note on the Multidisciplinary Nature of a Project

Engineering design projects inevitably require expertise from more than one domain or discipline; thus, called multi-disciplinary projects. Multidisciplinary does not necessarily involve project elements or team members from different departments (such as civil and mechanical), but could be composed of different
disciplines within the same department (such as software and power). As such multi-disciplinary projects could be composed of students and work elements from within the same engineering department, or across different departments. In either case, the domains of expertise and responsibilities must be defined for each team member online at the time of project selection. The dean and the FYP coordinators strongly encourage students to work with students and professors outside their home departments.

The following table provides an example of the various disciplines within each engineering department, which the students can refer to when considering specialists. Each FYP must include at least 3 disciplines.

<table>
<thead>
<tr>
<th>ECE dept.</th>
<th>CEE dept.</th>
<th>ME dept.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Circuits and Electronics</td>
<td>2. Geotechnical</td>
<td>2. HVAC</td>
</tr>
<tr>
<td>3. Communications and Networking</td>
<td>3. Transportation</td>
<td>3. Applied energy</td>
</tr>
<tr>
<td>5. Electromagnetics and RF</td>
<td>5. Engineering and Project Management</td>
<td>5. CAE (simulations)</td>
</tr>
<tr>
<td>7. HMI, Graphics, Visualization</td>
<td></td>
<td>7. Manufacturing</td>
</tr>
<tr>
<td>8. Intelligent Systems</td>
<td></td>
<td>8. Robotics</td>
</tr>
<tr>
<td>10. Signal Processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Software Engineering</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 1: Various disciplines within each department.

#### 2.2 A Note on Sponsored Projects

Occasionally, we have some FYP projects that are sponsored by local or regional companies. In this case, the sponsoring company has to sign a contract with the Technology Transfer Unit (TTU) in the office of Grants and Contracts (OGC). The contract would organize ownership of the commercial rights between AUB and the sponsoring company. It is advisable to check OGC policies posted on the website of the Office of Grants & Contracts, particularly the one pertaining to the Technology Transfer Unit (TTU), [http://www.aub.edu.lb/ogc/research/Pages/policy8.aspx](http://www.aub.edu.lb/ogc/research/Pages/policy8.aspx).
3  Fall Term Deliverables and Assessment

3.1  Deliverables
The deliverables for the fall term are:
- Weekly progress reports to be entered online every Friday by noon (individual)
- Log Book (individual)
- Minutes of advisor meetings to be included in appendix of progress and final report (group)
- Group Progress Report (Week 9)
- Group Final Report (Last week of classes)
- Group Final Presentation (Last week of classes)
- End of term peer and self assessment (Last day of classes)

Note: Templates with further details of the requirements are provided for ALL deliverables on Moodle.

3.1.1  Weekly Progress Reports
This is a form to be filled out by each student individually online using the FYP system by Friday noon of each week. The student will report briefly on the effort of the past week and the plan for the coming week. Also the student is expected to report on the teamwork quality. This is intended to formally report your individual efforts to your advisor. It is expected to take you only a few minutes to fill out this form so be brief but specific.

3.1.2  Log Book
Each team member is expected to keep a journal of the project. This is a private document not assessed for its content but for its completeness. This is intended to include all ideas, concepts, and draft designs you might have came up with. This is where you document any notes taken during meetings related to the project. This log book allows your advisor and coordinator insight into your efforts on the project. This log book is considered as scratch so do not worry about the quality of presentation too much as long as it is readable. Many research labs require this log book as it could function as documentation for patenting so make sure you date your entries. Your log book is RANDOMLY checked by the FYP coordinator so make sure to ALWAYS BRING YOUR LOG BOOK WITH YOU TO CLASS.

3.1.3  Minutes of Meetings
Minutes of meetings with the advisor must be taken and shared weekly with the advisor. Minutes must include list of participants, outline of discussion (not a transcript of he said she said), decisions taken, action items (responsible person and due date). All minutes must be included as appendix in the progress and final reports. These will be assessed for completeness and details. Template to be used for all minutes of meetings is provided in the appendix and on Moodle.

3.1.4  Group Progress Report
The purpose of this report is to provide students with early feedback regarding the proper direction of the project and the amount of progress made by the students thus far. This report represents a draft of the final fall report with some incomplete sections, but allows your advisor to gauge your progress and provide early corrective actions. The fall group progress report must follow the template provided in a separate file on Moodle and must at least contain the following:
- Cover/Title page: must contain the project title, group names with specialties, faculty advisor(s), sponsors (if any) and date of submission.
- Table of Contents
- List of Figures and Tables
- **Abstract/Executive Summary**: in one page summarize the main features of your project, what problem it is solving, how you propose to solve it and progress accomplished. This brief overview should give a snapshot of the overall structure of your final year project and progress accomplished.

- **Introduction**: a complete description of the problem statement. Outline the scope of your project. How did the problem present itself to you in the first place? Describe the nature of the problem in detail AND its importance. This section must clearly include description of motivation for the project and the desired needs it satisfies.

- **Requirements and Deliverables**: the formal requirements and specifications of your design must be set. Deliverables at the completion of the project must be listed.

- **Technical and non-technical constraints**: List and describe the constraints of your project (example: performance, size, power consumption, environmental, economical, social, political, ethical, etc.).

- **Literature review**: Does this problem or one similar to it exist anywhere else? Who is working on it? How have others solved it? Critically evaluate the pros and cons of the major approaches taken by previous workers (paper, patents, products, etc..). Clearly indicate how your approach or system is differentiated from the ones already done (if any).

- **Applicable Standards**: preliminary list of applicable standards used or related to the project.

- **Proposed solution methodology**: Outline your solution approach to solving the problem. What is the methodology you will follow?

- **Progress description**: this should include as applicable: preliminary design drafts, preliminary testing, preliminary implementation, etc… Note that progress is a primary factor in the assessment.

- **List of resources and engineering tools needed**: preliminary list of software and hardware tools used/needed and any components or material that needs to be ordered with the price (if known).

- **Detailed project schedule** and work plan laying out all identified tasks, task duration, task division of labor, scheduled meetings, deadlines, milestones, and deliverables.

- **Bibliography/References**: Include here all bibliographic materials referenced within your report. All project reports should contain a list of references. The list of references should come at the end, after the conclusions but before appendices. A list of references is where all the books, papers, computer programs, web pages, patents, standards, etc. that you have referred to in your report are included. The list of references must contain full bibliographic data sufficient to enable a reader to find the work in a library.

- **Appendix**: must at least include:
  - Updated **Project Description and Agreement Form**.
  - Minutes of all meetings up-to-date.

Some Writing Guidelines:

- The project report should reflect a professional level of quality. Students are expected to present their FYP reports in the manner that is required by a professional. This will require editing and rewriting to assure correct organization, spelling, grammar, and syntax.

- All FYP reports must follow the formatting according to the template provided.

- All graphs should be produced using graphics software and embedded as objects in the document (not gif or jpg as these have low resolution). All figures must have appropriate size to be readable and must have appropriate captions and labels. Each table must have a title, and all columns and rows must have appropriate headings. All figures and tables included in the report must be cited in the text, and must be numbered consecutively using Arabic numerals. The analysis and meaning of the values contained in the table should be fully elaborated in the body of the text. Do not include a table or figure that is not referenced and discussed in the text.

- The computations or solution procedures must be done or outlined in orderly steps with all assumptions clearly stated and their source given. All calculations must be reproducible. All units should be clearly indicated. Use of computer programs such as EXCEL or MATLAB is required.
The reference list should be explicit with the authors’ names, title, publisher, and date. References should be correctly cited in the text. Acknowledgments should be duly conferred and copied material should be duly credited. Figures or tables taken as is from a source must indicate so using “source: [reference]” by the caption, if the figure or table is taken from a source but modified it must be indicated using “adopted from: [reference]” by the caption.

All units should be clearly indicated.

Include page numbers

To avoid plagiarism, students need to take the following steps:

1. All quotes must be cited. In addition, a quote must be placed between quotation marks. A lengthy quote should be indented using single spacing. In general, quotations are NOT recommended.
2. Even when the students paraphrase (i.e., translate authors’ words into their own - something that is desirable) authors must still be given credit by including a citation. When a paragraph of material is based on some author's ideas, it is sufficient to have one citation placed at the end of the paragraph. Exceptions to this rule follow in (3) and (4).
3. All published statistics require a citation immediately following the sentence in which they appear.
4. All historical events and dates mentioned require an immediate citation.

Note: All reports will be submitted to turnitin any suspected plagiarism will be reported according to AUB rules and regulations without informing the group ahead of time.

3.1.5 Group Final Report

This report includes all the corrections and recommendations based on the graded Fall Progress Report. The fall Group Final Report must follow the template provided in a separate file on Moodle. In addition to the enhanced/improved sections that already exist in your progress report, your Fall Group Final Report must contain:

- **Design Alternatives**: This section demonstrates that you considered different design alternatives at the macro and micro level. Meaning high level design choices and small level (typically implementation) alternatives. For example, if we want to scan an area do we design a mobile or aerial vehicle (high level design choice)? Once the high level design is made, when we are designing the vehicle of choice what type of motor to use (low level design choice)? **Choices must be analyzed in relation to the project requirements and constraints.**
- **Design Choice and Iterations**: clearly indicate the current design choices (high and low level) and relate them to requirements and constraints. Describe the design iterations (if any at this point) that you went through to refine your design. Always relate your decisions to the requirements/specifications and the constraints.
- **Preliminary Implementation and Testing**: By the end of this term you are expected to have started implementing your design (or part of it) and partially testing components of it.
- **Implementation and Assessment Plan**: Include a detailed and updated schedule including the project implementation and assessment/testing plan for the next semester. Discuss the project’s target and milestone dates. If you will be implementing your project in discrete stages, describe them and discuss how far you think you will be able to get.
- **Appendix**: must at least include:
  - Updated **Project Description and Agreement Form**.
  - Minutes of all meetings up-to-date.
  - Some of the highly technical details from the above sections that are not particularly important or interesting enough to be included in the body of the report but nevertheless relevant. These details can be placed in the Appendix and referenced from the body of the
report. Include all relevant technical documentation, such as specification and datasheets, design documents, and code listings (not mandatory especially if too long).

3.1.6 Group Final Presentation

This oral presentation is an opportunity to practice and develop your skills. It provides an opportunity to receive feedback on your oral presentation skills and build a draft set of visual aids that can be used during your spring final presentation. Each team will present a synopsis of their progress, status, direction, and the future work planned, all of which will be critiqued by the committee. The purpose of the presentation is to get feedback, suggestions, and redirection, if necessary, in a timely manner to assure the success of the project. Challenging design projects may go down a variety of paths prior to choosing the best option!

Each team will be given 25 minutes to present, and an additional 10 minutes for questions and answers. Time will be managed closely and you will be stopped when time is up. The use of the provided template on Moodle is required. Exhibits and demonstrations are optional at this stage. Rehearse and know your presentation materials. All team members must participate equally by having a significant speaking role in the presentation. All team members must be present for the duration of all other groups’ presentations in their session. Make sure to practice and rehearsal before your presentation.

Your presentation constitutes a summary of your final group report and must include:

- Project title with advisor(s) name(s) and sponsor (if any)
- Team introduction (which includes each individual’s specialty)
- Overview slide
- Project introduction: Problem statement, motivation and desired needs that the project satisfies
- Formal requirements and expected deliverables
- Technical and non-technical constraints
- Applicable standards used
- Literature review including its analysis
- Design alternative considered with their analysis
- Design choice and design iterations
- Preliminary implementation and testing
- Implementation and assessment plan for the spring term
- Project schedule or timeline (Gantt chart)
- Conclusion

Some Presentation Guidelines:
- Complete your presentation at least a week in advance so that there is adequate time for practice.
- During presentation practice make sure that your presentation is within time limit. Make sure that you are comfortable with and confident in the information you are presenting, with the ability to answer questions.
- Speak loudly and clearly so that you can be heard in the back of the room.
- Display enthusiasm in your presentation. No one in the room will have more enthusiasm than you do, so set the tone by showing excitement in your design project.
- Introduce all team members, their specialty, the project title, and your advisor(s).
- Make your slides clear and crisp. Make sure all slides have sufficient contrast to show the text clearly—so that the text can be easily read.
- In bullet slides, make the bullets brief—typically no more than five words.
- Think of slides as your notes where you will fill in the blank. Each bullet slide included should require YOUR explanation to be well understood by the audience. In this way the audience will rely on YOU to bring the entire presentation together.
Photos should be large and clear. Use labels, arrows etc. to define and point out important features. Your photos should answer questions rather than create new ones.

When showing a graph, briefly define the axes and then tell the purpose of the graph and what it is intended to show.

Use a pointer or other device to draw the audience’s attention to what you are talking about at the moment. This will bring synchrony between you and the audience – they will know exactly what you are referring to and will not be lost.

When using a pointer, hold it firmly and be in control of it as you use it. Pass it to the next presenter effectively.

Use PowerPoint animation sparingly as a tool to help sequential ideas in a slide. DONOT use animation simply as fluff in transition between slides or bullets. It wastes time and becomes tiresome very quickly.

Be prepared and know the purpose of each slide. Explain each slide and keep in mind its purpose in the overall presentation. Do not over-explain your slides or waste valuable time babbling-on because you have forgotten the purpose of the slide.

Think about transitions between slides. Use them effectively to build anticipation for the next slide. Pose questions on one slide that are answered as you show the next slide. This will engage the audience.

As you present, look at the audience. Pick out three or four individuals throughout the room and look at them as you present. Their visual feedback will let you know if you are getting your message across.

Anticipate questions (for the Q&A period) and prepare extra slides that will help you answer them. This makes you look very professional and prepared.

In your practice sessions, note how often you say, “Um”, or “you know”, etc. and try to avoid this nervous habit. Silence is best when you have nothing to say. It is recommended that you video record your practice sessions and go over them together to identify any habits.

Finally, make sure to thank your audience and your sponsor when you are finished.

Do not use note cards!

3.1.7 End of Term Peer and Self Assessment

Throughout the duration of the project, the students are expected to perform in a professional and responsible manner. One aspect is your contribution and teamwork skills. As in many cases in life, you will be subjected to a peer assessment and you will be asked yourself to conduct a peer assessment. This is an online form on Moodle that you submit estimating the percentage of work carried out by each member. For example, in a group of three if each member contributed equally then the percentage you would give to each would be 33.33%. Please note this is not based on whether you like the other person or not but their contribution. The form you submit is totally private and remains between you and the FYP coordinator.

How will this affect your grade? Your final course grade will be scaled according to the total percentage you give yourself and your peers give you. For example, if the sum of percentages you obtained is 100% then you will get your grade as is. Otherwise, if you get a sum of 80% then you will get that percentage of your final grade. Clearly, you can potentially also get more than 100% of your final grade.

3.2 Assessment

For uniformity and fairness among groups, most of your grade will be based on published rubrics. Make sure to review the rubrics in order to understand what the expectations are. The grade distribution is according to the following table:
Table 2: Deliverables, grading criteria and percentages.

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Skills</th>
<th>Grading Criteria or Tool</th>
<th>Evaluated by</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group Final Report</strong></td>
<td>Design skills</td>
<td>Rubric</td>
<td>Committee report graders</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>Writing skills</td>
<td>Rubric</td>
<td></td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Other skills</td>
<td>Rubric</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td><strong>Group Final Presentation</strong></td>
<td>Presentation skills (Individual)</td>
<td>Rubric</td>
<td>Committee</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Supervisor Assessment</strong></td>
<td>Teamwork skills (Individual)</td>
<td>Rubric</td>
<td>Advisor</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Overall (Individual)</td>
<td>Assessment Form</td>
<td></td>
<td>Scaling overall grade</td>
</tr>
<tr>
<td><strong>Group Progress Report</strong></td>
<td>Problem definition, setting constraints, literature review and progress</td>
<td>Rubric</td>
<td>Advisor &amp; Coordinator</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Weekly Progress Reports (Individual)</strong></td>
<td>Professionalism</td>
<td>Every missed report -0.5%</td>
<td>Coordinator &amp; GA</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Log Book (Individual)</strong></td>
<td>Professionalism</td>
<td>Completeness and Details</td>
<td>Coordinator &amp; GA</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Minutes of Meetings</strong></td>
<td>Professionalism</td>
<td>Completeness and Details</td>
<td>Coordinator &amp; GA</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Lecture Attendance</strong></td>
<td>Professionalism</td>
<td>Every missed lecture -1%</td>
<td>Coordinator &amp; GA</td>
<td>-</td>
</tr>
<tr>
<td><strong>Peer and Self Assessment (Individual)</strong></td>
<td>Teamwork and individual contribution</td>
<td>Peer and Self Assessment Form</td>
<td>Coordinator &amp; GA</td>
<td>Scaling overall grade</td>
</tr>
</tbody>
</table>

In order to improve the possibility of differentiating between the work done by different members in an FYP team, the advisor assessment is sought. The supervisor overall assessment will be used to scale the overall grade in a similar manner to the peer and self assessment. The following criteria as they relate to each student in the team will be used in the supervisor assessment:

- In-depth knowledge of the problem and its objectives
- Knowledge of the relevant literature and the merits of existing solutions
- Extent to which the student participates in the discussions carried during the scheduled meetings with the advisor
- Frequency of the attendance of these meetings
- Creativity and innovations in the generation of new ideas and solutions while accounting for the design specifications
- Critical thinking in the evaluation of new solutions
- Care in the documentation of progress done during the development of the project in various stages
- Anticipation of potential problems in advance
- Participation in assigned team activities
4 Fall Calendar and Schedule

This section describes the calendar for a typical FYP project. The description shows the scheduled events and due dates for the entire semester. Review the calendar and schedule carefully each week to remind yourself of your responsibilities and enable you to meet the required deadlines. Late deliverables will not be accepted and missing class for any reason (other than documented medical report from AUBMC) will not be excused.

Also, please note the dates of the various lectures that are scheduled during the fall semester. The topics will include such things as doing research in the library, how to be an affective team member, how to write a report, and the dos and don’ts of an oral presentation.

**Table 3: Schedule of events and due dates for the fall semester.**

<table>
<thead>
<tr>
<th>Week</th>
<th>Event or Due Date</th>
</tr>
</thead>
</table>
| Week 1 (Sept. 26) | • (Sept. 26) Projects posted online by faculty members  
• Form groups  
• Meet faculty members  
• Select project online by the end of the week for round one allocation |
| Week 2 (Oct. 3)   | • Early in the week faculty members accept groups for round one allocation  
• Groups with no allocated project select a new project for round two allocation |
| Week 3 (Oct. 10)  | • Early in the week faculty members accept groups for round two allocation  
• Forced allocation of groups  
• Expected to start meeting weekly with your advisor as of this week and taking minutes  
• Required to submit individual progress reports weekly by Friday noon of each week as of this week  
• Required to start using the log book |
| Week 4 (Oct. 17)  |                                                                                   |
| Week 5 (Oct. 24)  |                                                                                   |
| Week 6 (Oct. 31)  |                                                                                   |
| Week 7 (Nov. 7)   |                                                                                   |
| Week 8 (Nov. 14)  |                                                                                   |
| Week 9 (Nov. 21)  | Group Progress Report is due                                                      |
| Week 10 (Nov. 28) |                                                                                   |
| Week 11 (Dec. 5)  |                                                                                   |
| Week 12 (Dec. 12) |                                                                                   |
| Week 13 (Dec. 19) |                                                                                   |
| Week 14 (Dec 26)  |                                                                                   |
| Week 15 (Jan. 2)  |                                                                                   |
| Week 16 (Jan. 9)  | • Group Final Report is due  
• Group Final Presentation is due  
• Peer and Self Assessment Form due last day of classes (on Moodle) |
Table 4: Schedule of lectures for the fall semester.

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Date</th>
<th>Speaker</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Sept. 28, 2011</td>
<td>No Class</td>
<td>No Class</td>
</tr>
<tr>
<td>Week 2</td>
<td>Oct. 5, 2011</td>
<td>FYP Coordinator</td>
<td>FYP - introduction, expectations, deliverables, logistics</td>
</tr>
<tr>
<td>Week 3</td>
<td>Oct. 12, 2011</td>
<td>Khaled Noubani</td>
<td>Sources and citing</td>
</tr>
<tr>
<td>Week 4</td>
<td>Oct. 19, 2011</td>
<td>Lina Choueiri</td>
<td>Plagiarism and Turnitin</td>
</tr>
<tr>
<td>Week 5</td>
<td>Oct. 26, 2011</td>
<td>Amy Zenger</td>
<td>Oral and written communication</td>
</tr>
<tr>
<td>Week 6</td>
<td>Nov. 2, 2011</td>
<td>FYP Coordinator</td>
<td>Technical and Non-technical constraints, Literature review</td>
</tr>
<tr>
<td>Week 7</td>
<td>Nov. 9, 2011</td>
<td>Issam Srour</td>
<td>Project planning and management</td>
</tr>
<tr>
<td>Week 8</td>
<td>Nov. 16, 2011</td>
<td>Dima Jamali</td>
<td>Professional responsibility and teamwork</td>
</tr>
<tr>
<td>Week 9</td>
<td>Nov. 23, 2011</td>
<td>No Class</td>
<td>No Class</td>
</tr>
<tr>
<td>Week 10</td>
<td>Nov. 30, 2011</td>
<td>Antoine Feghali</td>
<td>Entrepreneurship and commercialization</td>
</tr>
<tr>
<td>Week 11</td>
<td>Dec. 7, 2011</td>
<td>FYP Coordinator</td>
<td>Design</td>
</tr>
<tr>
<td>Week 12</td>
<td>Dec. 14, 2011</td>
<td>FYP Coordinator</td>
<td>Design of Experiments</td>
</tr>
<tr>
<td>Week 13</td>
<td>Dec. 21, 2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 14</td>
<td>Dec. 28, 2011</td>
<td></td>
<td>Christmas no classes</td>
</tr>
<tr>
<td>Week 15</td>
<td>Jan. 4, 2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 16</td>
<td>Jan. 11, 2011</td>
<td></td>
<td>Final Week of Classes</td>
</tr>
</tbody>
</table>

Note: These schedules are tentative and subject to change with prior notice.

Note: Classes will be held in the hostler center and will start at 5pm till 6:30pm make sure you arrive early. Late arrival will not be accepted. Make sure to bring your student ID with you as attendance is taken by scanning your ID.
5 Getting Started After Selecting the FYP

Once the students in a team have decided on a topic and found an advisor, they can start working on the project. It is the team’s responsibility to ensure that all resources required for the project are identified and made available as early as possible in the fall term.

5.1 Advisor Role and Meetings

Very early on in the project students must discuss with their advisor the project and its objectives, the previous work that can be used, the main aspects of the approach that could be considered, the main tasks to be carried out, and estimates of the time each will take. It is the team’s responsibility to regularly review the Project Description and Agreement Form with the assistance of their advisor, keeping in mind deliverables required. Often the original goals turn out to be over-ambitious and have to be scaled back. Almost as often, parts of the project prove easier than anticipated and additional tasks or goals can be inserted. Be prepared to be flexible but keep moving forward.

Your advisor has the responsibility to meet with you to give you guidance, direction, and insight throughout your project. The advisor plays the role of the client or consultant. Ultimately the team is responsible for the project and its successful completion. Your advisor will help you get going in the right direction, and re-directing you when necessary. Note carefully that these projects may result in one or more dead ends along the way to successful completion. From each mistake something can be learned moving the successful results closer.

After a meeting or two with your advisor, you are advised to prepare an agenda for every advisor meeting—(see sample agenda in Appendix). Discuss the work you have done, research, etc., and make decisions as to their value and relevance with respect to your project. Your advisor will give insight to help you make these decisions. In time, you should be able to make these decisions as a team on your own. In each meeting one of the team members must take minutes and email them to the group and advisor soon after the meeting. Meetings must be conducted weekly it is recommended to agree on a common time with your advisor and use that time weekly. All group members are required to attend all scheduled meetings with their advisor.

In all of your meetings, you should come up with an action plan for what is to be done for the next meeting and thereafter. Focus on the “specialist’s role” for each team member. NEVER leave an advisor meeting not knowing what to do next. Meetings are where you demonstrate your leadership particularly in your discipline. Members of the team will take turns leading the meetings with their advisor. Remember, this is your meeting, your agenda, and your responsibility.

For all of your meetings, be on time, be professional, and be prepared. Behave like professional engineers whose time is valuable and who respects the time of others. Have at your meetings all pertinent project files, papers, drawings, notes, your project log books, calculators, etc. Carry a portable file case to your meetings if necessary, and keep your files and material organized for quick retrieval. Make sure that you have taken the proper steps and have proper organizational tools to handle the large amount of information, documents and files that will accumulate during your project.

5.2 Teamwork and Roles

Early on, plan to meet your team members frequently at a scheduled time and place. This should be the rule rather than the exception. You will get a good start on your project, and develop the habits you need to get the work done.

Share your research and work with each other. Do not let any one person do all the work or none of the work. This is to be a team effort. Each team member must assume a “specialty role” in a specific
domain/discipline, take leadership and be accountable for it. Eventually you must divide the work among your team members, and develop trust that the work will get done. If problems arise, work them out in a constructive manner. Remember that the team consists of its members. Make sure to inform your advisor and the FYP coordinator early on if teamwork issues arise or if you happen to have free riders in the group. The earlier these issues are resolved the better.

5.3 Project Schedule: Timetabling the Work

The exact timetable should be agreed upon between the students and their advisor. To build a timetable, high-level deliverables are assigned to each month similar to the example shown in the following table. These high-level deliverables are then decomposed further down into smaller work elements and assigned to a smaller time period (such as week). This process of work breakdown can be carried out further to reach a list of daily work elements that are assigned to a particular member of the team.

<table>
<thead>
<tr>
<th>When</th>
<th>What (deliverables)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Term</strong></td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>▪ Teaming&lt;br&gt;▪ Project selection&lt;br&gt;▪ Background reading</td>
</tr>
<tr>
<td>November To Mid January</td>
<td>▪ Planning and time table; design alternatives and analysis; components; initial testing; required budget; report; presentation</td>
</tr>
<tr>
<td><strong>Spring Term</strong></td>
<td></td>
</tr>
<tr>
<td>February To April</td>
<td>▪ Implementation and testing to prove that the specifications have been satisfied&lt;br&gt;▪ Verification and validation applied at all stages&lt;br&gt;▪ Critical appraisal of the project, indicating the rationale for the design/implementation decisions, lessons learned during the course of the project, and evaluation of the product and the process.</td>
</tr>
<tr>
<td>May</td>
<td>▪ Start writing report around the first half of April.&lt;br&gt;▪ Demonstrate results to your advisor; conclude writing; submit report, and prepare for presentation of FYP</td>
</tr>
</tbody>
</table>

A display of the drilled-down list of all the work elements along a timeline constitutes the project schedule. The project schedule can be generated using several software packages, such as MS project.

5.4 Engineering Approach

In the execution of a project, an “engineering” approach must be adopted. Engineers try to come up with the best feasible solution to meet the particular needs of a problem. Therefore, students need to demonstrate explicitly that they have made sound judgments based on the knowledge they have gained about the problem from readings and experience (what you have found out for yourself, e.g. by experiment). One of the most common ways of finding further sources of information is to look at the list of papers/books/articles cited in a document already read. Often one can start with a recent paper on a topic and, by following its references (transitively), reach the most important papers ever written on that topic.

It is important that students recognize the quality of what they read. Particularly on the Internet, published material is not necessarily authoritative. Students need to be critical of what they read, and don't simply accept something as true just because it is there.
Ways of recognizing high quality information from low quality include:

<table>
<thead>
<tr>
<th>Indications of High Quality</th>
<th>Indications of Low Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>In a <em>refereed</em> journal (<em>i.e.</em>, it has been reviewed by experts)</td>
<td>Self-published or unpublished work</td>
</tr>
<tr>
<td>In a widely-read source</td>
<td>In an obscure publication</td>
</tr>
<tr>
<td>Author is well known and respected</td>
<td>Author does not have other publications in the field</td>
</tr>
<tr>
<td>Referred to by other sources</td>
<td>Does not refer to other published work in the topic area</td>
</tr>
<tr>
<td>Manuals, data sheets, standards, or user guides from company or organization web sites.</td>
<td>Information from personal or obscure web sites.</td>
</tr>
</tbody>
</table>
Appendix
Project Description and Agreement Form

American University of Beirut
Department of Electrical and Computer Engineering
Project Description and Agreement Form
Final Year Project

<table>
<thead>
<tr>
<th>Faculty Supervisor</th>
<th>Co-Supervisor [optional]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sponsor [optional]</th>
<th>Is there industry support or funding the project?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Descriptive title not necessarily the final title that will be adopted by the team</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Description and Design Aspects</th>
<th>Motivation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the main motivation for the project? Specify the desired needs that the final product is expected to meet.</td>
<td></td>
</tr>
<tr>
<td>Desired Needs:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expected Deliverables</th>
<th>Required deliverable(s) from the team at the conclusion of the design project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>2-</td>
</tr>
<tr>
<td>3-</td>
<td>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical Constraints</th>
<th>A preliminary list of multiple realistic technical constraints, e.g. power, accuracy, real-time operation, ... The technical constraints included should be detailed and specific to the design project not generic.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>2-</td>
</tr>
<tr>
<td>3-</td>
<td>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Technical Constraints</th>
<th>A preliminary list of multiple realistic non-technical constraints, e.g. cost, environmental friendliness, social acceptance, political, ethical, health and safety, etc... The non-technical constraints included should be detailed and specific to the project not generic.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>2-</td>
</tr>
<tr>
<td>3-</td>
<td>.</td>
</tr>
<tr>
<td><strong>Contemporary Issues</strong></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td><em>Cite one or more recent articles pertaining to the project or project area: news articles, blog discussions, academic articles, conference topics, etc.</em></td>
<td></td>
</tr>
<tr>
<td>Resources and Engineering Tools</td>
<td></td>
</tr>
<tr>
<td><em>Identify resources and engineering tools needed and whether they are available or need to be acquired (if known), e.g. software licenses, instruments, facilities, components,</em></td>
<td></td>
</tr>
<tr>
<td>Possible Applicable Standards</td>
<td></td>
</tr>
<tr>
<td><em>List potential standards directly or indirectly used or involved in the project</em></td>
<td></td>
</tr>
<tr>
<td>List of Disciplines</td>
<td></td>
</tr>
<tr>
<td><em>Identify at least THREE engineering disciplines</em> (within or outside ECE)</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td></td>
</tr>
<tr>
<td><em>Please consider the number of disciplines checked above</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 students OR 4 students (if 4 please provide a justification)</td>
</tr>
<tr>
<td>Required Courses [Optional]</td>
<td></td>
</tr>
<tr>
<td><em>List the courses that are essential for the successful execution of the project (especially advanced courses)</em></td>
<td></td>
</tr>
<tr>
<td>Date Submitted</td>
<td></td>
</tr>
</tbody>
</table>
**Meeting #:**

Date: 7.6.2011  Time: from  to  Location: 

Meeting called by  Group or advisor

Attendees  List names of all attendees

Minutes taker  Name of minute taker who is responsible for the accuracy and completeness of minutes

**Agenda Item: Each meeting can have several items. Add as many as needed.**

**Discussion**

Briefly summarize the main discussion points made

**Conclusions**

Briefly enumerate all conclusions reached in regards to this agenda item

**Action Items**

<table>
<thead>
<tr>
<th>Action Items</th>
<th>Person Responsible</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter a row for each action item related to this agenda item</td>
<td>Name of person(s)</td>
<td>Due date</td>
</tr>
</tbody>
</table>

**Agenda Item: Testing the...**

**Discussion**

Went over the proposed testing protocol by the group. The advisor suggested ....Student 1 suggested...

**Conclusions**

- The tests will include.
- The device......

<table>
<thead>
<tr>
<th>Action Items</th>
<th>Person Responsible</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get the....</td>
<td>Student 1</td>
<td>Within two weeks</td>
</tr>
<tr>
<td>Look into the...</td>
<td>Student 2</td>
<td>Within two days</td>
</tr>
<tr>
<td>Buy....</td>
<td>Student 1 and Student 3</td>
<td>By November 20</td>
</tr>
</tbody>
</table>

**Agenda Item: Defining technical constraints**

**Discussion**

Went over the proposed technical constraints by the group. The advisor suggested ....

**Conclusions**

- The power related technical constraint should be removed
- The size related technical constraint should be modified to include the ...

<table>
<thead>
<tr>
<th>Action Items</th>
<th>Person Responsible</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look into the size of the possible batteries to be used....</td>
<td>Student 1 and Student 2</td>
<td>By next meeting</td>
</tr>
</tbody>
</table>
Example Meeting Agenda

Advisor Meeting Agenda – Oct. 30, 2010
FYP Spring 2010
Project Name
Student Team: ABC, XYZ, and WV
Meeting Leader: XYX

1. Cover new information [10 min]
   a. Problem statement
   b. Overview of potential solutions
2. Go over pictures [5 min]
   a. Explain the process
   b. Label the die
   c. Demonstrate knowledge of die set on board
   d. Find relevant/useful pictures
3. Progress on Inventor files [5 min]
   a. 3D Printing
   b. Finish date?
4. Material Specification [5 min]
   a. Aluminum-Bronze
   b. D2 Tool Steel
   c. Others?
5. Microsoft Project [5 min]
   a. Progressive
   b. Rough Draft
   c. Teams
6. Future [5 min]
   a. Experts on campus
   b. Materials
   c. Machining
7. Brainstorming/Discussion (5 min)