Course Policy Concerning Grade Determination

1.0 Introduction:

ECE477 is a course that requires both individual and team-based efforts in order for a given student and team to succeed. The ability of a student to graduate from ECE477 and the Purdue University Electrical Engineering program hinges on the student and team successfully satisfying the evaluation criteria for ECE477. The method by which student grades are determined in ECE477 is described within this document.

1.1 Individual and Team Grade Components:

Student grades within ECE477 are based upon individual and team grade components. For the purposes of the course, the individual component of a student's grade is based upon efforts undertaking specifically by the student in question. The team component of a student's grade is based upon efforts undertaken by both the student and other team members that impact the success of the team as a whole.

2.0 Grade Determination

Student course grades will be determined per the breakdown in figure 1, below:

Team Components (40% of total)		Individual Components (60% of total)	
Project Success Criteria Satisfaction*	20.0%	Weekly Progress Update Reports*	20.0%
Design Review*	15.0%	Design Component Report*	15.0%
Final Presentation*	10.0%	Professional Component Report*	15.0%
Final Project Archive*	15.0%	Individual Contribution	20.0%
Concept Development Assignments	10.0%	Class Attendance and Participation	10.0%
System Integration and Packaging	20.0%	Mandatory Lab Session Attendance	10.0%
Educational (Senior Design) Report*	5.0%	Midterm and Final Confidential Peer Reviews	5.0%
PCB Completion and Submission*	5.0%	Design Review and Final Presentation Peer Evals	5.0%
Bonus Components (added to grade total)			
Early completion		2.0% per week early (team)	
Design bonus contracts		(variable – negotiated with course staff)	
Design Showcase participation		1.0% per individual	
Design Showcase poster		1.0% per team	
Motorola Award voting		0.5% per individual	
TA evaluation		0.5% per individual	
Instructor discretion (borderline resolution)		0.5% per individual	

** items directly related to ABET course outcome assessment*

Figure 1. Determination of Student Grades

A description of each component of the grade determination is discussed in sections 4, 5, and 7. Note that some items are directly related to course outcomes; this is is discussed in further detail in section 3.

Student performance on various elements of the course will be used to calculate a student's raw weighted percentage (RWP) based on the weights in figure 1, above. The RWP will then be "curved" (i.e. Mean-shifted) with respect to the upper percentile of the class to obtain a normalized weighted percentage (NWP). Letter grades are then assigned on a 90-80-70-60 scale. Letter grades in the upper 30% of each range will receive a "+" designation, and those that fall in the lower 30% of each range will have a "-" designation.

2.1 Incompletes and Conditional Failures

A grade of "incomplete" (I) or "conditional failure" (E) will be given *only* for cases in which there are ***documented*** medical or family emergencies that prevent a student from completing required course work by the end of the semester. University regulations stipulate that a student must be passing in order to ***qualify*** for a grade of "I" or "E".

2.2 Borderline Cases

A "borderline" is officially defined as a normalized weighted percentage (NWP) within 0.5% of a cutoff when the **final** grade calculation is performed. Before course grades are assigned, the instructor will carefully examine all such cases and determine if the next higher grade is warranted. Grade adjustments exist at the sole discretion of the ECE477 instructional staff and are not guaranteed.

2.3 Professionalism and Academic Dishonesty

Unless otherwise noted, students are expected to do their own work, and not copy the work of any other individual, past or present. Any and all sources used in the completion of ECE477 lab activities should be properly referenced, and where appropriate, the level of original work performed by the student should be noted. Any documented case of academic dishonesty will result in a failing grade for the course as well as possible disciplinary action. All cases of academic dishonesty will be reported to the ECE Associate Head as well as to the Dean of Students. ***A professional person does not take credit for the work of somebody else.***

3.0 Learning Outcome Assessment

In order to satisfy ABET course requirements, each student is expected to successfully demonstrate the following learning outcomes:

i. An ability to apply engineering design to create a product that meets the specified needs of this engineering design experience with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

ii. An ability to develop and conduct experimentation, analyze and interpret data, and use engineering judgment to draw conclusions related to the development of the product of this engineering design experience.

iii. An ability to identify, formulate, and solve complex engineering problems arising from this engineering design experience by applying principles of engineering, science, and mathematics.

iv. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives associated with this design experience.

v. An ability to communicate effectively with a range of audiences appropriate to this design experience in both a written report and oral presentation.

vi. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies to complete the engineering design experience associated with this course.

vii. An ability to recognize ethical and professional responsibilities associated with this engineering design experience and make informed judgments which must consider the impact of the product of this engineering design experience in global, economic, environmental, and societal contexts.

Fulfillment of course outcomes shall be determined by student performance of course elements outlined in figure 2, below.

Outcome	Course Outcome	Evaluation Instruments Used
(i)	An ability to apply engineering design to create a product that meets the specified needs of this engineering design experience with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	Design Component Homework
(ii)	An ability to develop and conduct experimentation, analyze and interpret data, and use engineering judgment to draw conclusions related to the development of the product of this engineering design experience.	Individual Progress Reports
(iii)	An ability to identify, formulate, and solve complex engineering problems arising from this engineering design experience by applying principles of engineering, science, and mathematics.	PCB Completion and Submission
(iv)	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives associated with this design experience.	Project Specific Success Criteria Satisfaction (general and project-specific)
(v)	An ability to communicate effectively with a range of audiences appropriate to this design experience in both a written report and oral presentation.	Professional Component Homework
(vi)	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies to complete the engineering design experience associated with this course.	Educational (Senior Design) Report
(vii)	An ability to recognize ethical and professional responsibilities associated with this engineering design experience and make informed judgments which must consider the impact of the product of this engineering design experience in global, economic, environmental, and societal contexts.	Midterm Design Review, Final Presentation, and Final Project Archive

Figure 2. Course Outcome Assessment

A minimum score of 60% shall be required on all associated course components of a given outcome in order for a student to successfully pass a given course outcome. An exception to this rule is made for success criteria satisfaction, for which 100% of the general success criteria must be passed in addition to 60% of the project-specific success criteria.

4.0 Description of Team Components

The team component of a student's grade is responsible for 40% of their overall grade. The elements of the team component score are listed out in detail in the subsections below.

4.1 Project Success Criteria Satisfaction

In order to determine the degree to which a senior design project has succeeded or failed, student teams are expected to select five project-specific success criteria (PSSCs) to demonstrate to showcase their project and its abilities. At least three PSSCs must be successfully demonstrated in order to satisfy an ABET course outcome (this is further described in section 3). Course policies regarding project success criteria are further described in the PSSC Policy, available on the ECE477 course website. Satisfaction of project success criteria is worth 20% of the student's team-component grade, or 8% of the student's overall grade.

4.2 System Integration and Packaging

In addition to a team's ability to satisfy project success criteria, the system integration score is a measure on the part of the course staff of how successfully the team was able to produce a refined final prototype of the proposed senior design project. This score includes things such as whether or not the senior design project was packaged, and how successfully and professionally it was done, as well as the extent to which electronic systems were combined together to produce a complete, working design. System integration and packaging is worth 20% of the student's team component grade, or 8% of the student's overall grade.

4.3 Midterm Design Review

During the middle of the semester, all ECE477 teams are expected to present their projects in the form of a midterm design review. The midterm design review allows course staff to assess students' presentation skills as well as their preparation and progress at the middle of the semester. A 60% on the midterm design review is required to partially satisfy an ABET course outcome (this is further described in section 3). The midterm design review is worth 15% of the student's team component grade, or 6% of the student's overall grade.

4.4 Final Presentation

ECE477 student teams are required to conduct a final presentation summarizing their development activities and progress on their senior design projects over the course of the semester. The final presentation allows course staff to assess students' presentation and communication skills. A 60% on the final presentation is required to partially satisfy an ABET course outcome (this is further described in section 3). The final presentation is worth 15% of the student's team component grade, or 6% of the student's overall grade.

4.5 Final Project Archive

At the end of the semester, student teams are required to compile revised assignments and source code and submit a final project archive for their respective senior design projects. The final archive provides the course staff with the opportunity to assess the student teams' abilities to communicate technical information in written form. A 60% on the final archive is required to partially satisfy an ABET course outcome (this is further described in section 3). The final archive is subject to the late assignment policy defined in section 6. The archive is worth 15% of the student's team component grade, or 6% of the student's overall grade.

4.6 Concept Development Assignments

During the earlier stages of the design process, ECE477 student teams are expected to complete a number of concept development assignments. These assignments are listed below:

2. Functional Specification

4. Component Analysis

6. Bill of Materials

The purpose of these assignments is to help the team determine global design aspects and requirements of their projects, and these assignments are to be completed by and with input from the entire team. Assignments 5 and 6, though separate items, are graded as a single item. Completion of the functional specification is worth 5% of the student's team grade and completion of the component analysis and bill of materials is worth 5% of the student's team grade, for a total of 10% of the student's team grade or 4% of their overall grade.

4.7 ECE477 Educational Report

To satisfy educational requirements of ECE477, student teams are expected to complete a senior design educational summary at the end of the senior design semester. This report is used to describe the educational development of student teams over the course of their ECE477 senior design semester. The senior design educational summary is subject to the late assignment policy defined in section 6. The senior design educational summary is worth 5% of the student's team component grade, or 2% of the student's overall grade.

5.0 Description of Individual Components

The individual component of a student's grade is responsible for 60% of their overall grade. The elements of the individual component score are listed out in detail in the subsections below.

5.1 Progress Reports

Students are expected to maintain a progress report over the course of their semester within ECE477. Progress reports are brief (generally 1 page or less) reports which are evaluated by course staff frequently throughout the semester. A 60% or better average score on progress reports is required to satisfy an ABET outcome; this is described in further detail in section 3. Course policies regarding progress reports are detailed further in the Progress Report Policy, available on the ECE477 course website. Performance on progress reports is worth 20% of the student's individual component grade, or 12% of the student's overall grade.

5.2 Individual Contribution

ECE477 is a team-based course in which individual student efforts contribute to the overall success or failure of an ECE477 student team. The individual contribution score is an assessment by the course staff of how much a student contributed and helped or hindered their ECE477 team. Level of individual contribution is worth 20% of the student's individual component grade, or 12% of the student's overall grade.

5.3 Design Component Report

The following ECE477 assignments are considered design component reports for the purposes of the class:

3. Software Overview

5. Electrical Overview

7. Mechanical Overview

8. Software Formalization

Each ECE477 student team is required to complete one copy of each of these assignments, and each assignment is to be completed by a different member of the ECE477 team. A 60% or better score on the design component report is required to satisfy an ABET outcome; this is

described in further detail in section 3. The design component reports are subject to the late assignment policy defined in section 6. The design component report is worth 15% of the student's individual component grade, or 9% of the student's overall grade.

5.4 Professional Component Report

The following ECE477 assignments are considered professional component reports for the purposes of this class:

9. Legal Analysis
10. Reliability and Safety Analysis
11. Ethical/Environmental Impact Analysis
12. User Manual

Each ECE477 student team is required to complete one copy of each of these assignments, and each assignment is to be completed by a different member of the ECE477 team. A 60% or better score on the professional component report is required to satisfy an ABET outcome; this is described in further detail in section 3. The design component reports are subject to the late assignment policy defined in section 6. The professional component report is worth 15% of the student's individual component grade, or 9% of the student's overall grade.

5.5 Class Participation

To help facilitate student's attendance and attention in ECE477 lectures, class participation exercises are given to students during ECE477 lecture hours. These class participation exercises are cumulatively worth 10% of the student's individual component grade, or 6% of the student's overall grade. In the event that class participation is not assessed, the grade allocation to class participation may be reallocated to individual contribution at the discretion of the course staff.

5.6 Mandatory Lab Session Attendance

In the interest of ensuring students are held accountable for project work and staff are up to date on student project issues and progress, weekly mandatory lab sessions are held in which ECE477 course staff meet with students. During these sessions, students are expected to detail their progress concerning their projects and homework assignments. Students are expected to attend their mandatory lab sessions and attendance is taken; failure to attend a minimum of 80% of these mandatory sessions may result in course failure. Mandatory lab session attendance is worth 10% of a student's individual grade, or 6% of the student's overall grade.

5.7 Confidential Peer Reviews

During the midterm and final portions of an ECE477 semester, feedback on student performance is provided in the form of confidential peer reviews filled out by student team members. The midterm and final confidential peer reviews are cumulatively worth 5% of the student's individual component grade, or 3% of the student's overall grade.

5.8 Design Review and Final Presentation Peer Evaluations

During the midterm design review and final presentations, feedback on student presentation performance is provided in the form of peer evaluations. The midterm design review and final presentation peer evaluations are cumulatively worth 5% of the student's individual component grade, or 3% of the student's overall grade.

6.0 Late Assignment Policy

Homework assignments are due by the deadlines described in the course calendar (typically

Fridays) at NOON. In the event of late assignments, the following penalties are assessed:

1. -10% for every day the assignment is submitted late (rounded up)
2. If an assignment is more than 3 days late, the ECE477 course staff may grade it at their discretion.

Final project deliverables (assignments 13 and 14) are due the Monday of finals week for a given ECE477 semester at 5:00pm. Late penalties are assessed in accordance with the late policy outlined above. It should be noted that late materials WILL NOT be accepted after 5:00pm on the Thursday of finals week.

7.0 Description of Bonus Components

In addition to the project and team components, opportunities exist for additional bonus credit. These bonus credit opportunities are elaborated on in the subsections below.

7.1 Early Completion Bonus Credit

Student teams who successfully complete their ECE477 senior design project early may qualify for early completion bonus credit. This is to inspire student teams to work hard and be proactive by working ahead in their senior design course. For each week prior to the final week of the semester that a team completes their project, they will receive an additional +3% bonus credit to their overall grade. This bonus credit is subject to certain conditions, and is awarded at the sole discretion of the ECE477 course staff.

In order to qualify for early completion bonus credit, a team must successfully demonstrate all of their final PSSCs (preliminary PSSCs may not be used for this purpose). In addition, all homeworks and project deliverables must be submitted (with the exception of the Poster, ECE477 Educational Report, ECE477 Final Report, and Final Project Archive.

The Friday prior to the Senior Design Project Showcase shall be used as the determining date for early completion bonus credit. All projects demonstrated and completed prior to 5pm EST on that Friday shall be subject to the 2% bonus credit, with an additional 2% bonus credit for every additional week early completed.

7.2 Poster and Design Showcase Participation

At the end of the senior design semester, ECE 477 student teams may have the option of participating in a symposium known as the Spark Challenge Design Showcase (determinations are made at the discretion of course staff if the team has completed 3 preliminary PSSCs). If selected and agreed upon, the team is then required to produce a poster detailing their senior design projects. The senior design posters are used to present ECE 477 to the general public, as well as for promotional materials for ECE 477 used by the course staff and Purdue School of Electrical Engineering. Spark Challenge participation, along with a completed poster, is worth an additional 2% bonus credit to participating students' grades.