Policies Regarding Project Specific Success Criteria

1.0 Overview of PSSCs:

ECE477 is a student-led design class in which projects are chosen by student teams and proposed to ECE477 course staff. Every project is different, but there still needs to be a method of determining whether a group of students has succeeded or failed in their project endeavor. To judge a team's success (or lack thereof), students must fulfill and demonstrate a series of project-specific success criteria (PSSCs).

A PSSC is a project-based objective that a senior design team wishes to accomplish during the course of the semester. For the purposes of the course, a senior design team must develop 5 distinct PSSCs and demonstrate them to their TA. Successful demonstration of at least 3 PSSCs during the semester is necessary to pass ECE477. Due to the nature of the course, there are some hard rules, as well as some general guidelines, when it comes to selecting PSSCs. These rules and guidelines are detailed below.

2.0 Course Rules Concerning PSSCs:

There are a few hard rules regarding PSSCs. These are:

1. Course staff shall have the final determination on the validity and successful demonstration of any and all PSSCs. NO EXCEPTIONS.
2. All student teams must select 5 project-specific success criteria (PSSCs) as part of their design process.
3. In order to pass ECE477, all student teams must successfully demonstrate 3 of their 5 PSSCs. For purposes of satisfying the course outcome, students may demonstrate preliminary PSSCs in lieu of final PSSCs. Final and preliminary PSSCs are explained in section 2.1, below.
4. Project-specific success criteria (PSSCs) based on the default functionality of a component are prohibited. This rule is further elaborated upon in section 2.2, below.
5. All project-specific success criteria (PSSCs) must be focused on the student-implemented embedded hardware. This is explained in section 2.3, below. An exception to this rule is made for projects deemed by the course staff to be motherboard-based projects. Motherboard projects are described in section 2.4, below.
6. All project-specific success criteria should be phrased in terms of capabilities (“An ability to...”)

2.1 Preliminary and Final PSSCs

In order to fulfill one of the ABET outcomes for this course, and thereby pass ECE477, students must demonstrate 3 of the 5 PSSCs they choose. To assist students in fulfilling this course requirement, PSSCs have been delineated by preliminary and final PSSCs.

Preliminary PSSCs are PSSCs that have been demonstrated on the final hardware, but not necessarily in final packaging or in a fully system-integrated project. The final hardware distinction is important; no prototyping or development hardware will be accepted for passing a PSSC.

Successfully demonstrating a preliminary PSSC will provide the team with acknowledgement of passing the PSSC for the purposes of the course outcome. No points towards a student's grade are awarded for the demonstration of a preliminary PSSC.

Final PSSCs are PSSCs that are successfully demonstrated on the packaged, fully-integrated final hardware. Successful demonstration of a final PSSC satisfies that PSSC from the perspective of the course outcome and additionally provides the student team with points towards their course grade. Final PSSCs can be demonstrated directly; it is recommended though not necessary to first demonstrate a preliminary version of the PSSC.

2.2 The Default Functionality of a Component Rule

In choosing PSSCs for a project, it is necessary that students choose criteria that will challenge and push them. As such, PSSCs which are based upon the default functionality of a component are prohibited.

One of the most common violations of this rule involves PSSCs focused around the use of a particular interface. At the time of this writing, projects utilizing wireless interfaces are extremely common, and many students write a PSSC of the general form “An ability to send/receive data via a wireless interface” (where the interface might be RF, bluetooth, wifi, Zigbee, etc.). If a team is using an off-the-shelf solution for our interface, this is not an acceptable PSSC, as it largely comes down to hooking up the interface and configuring it.

Examples exist beyond interfacing. If a team has onboard memory, then a PSSC about storing data in memory would not be acceptable as a PSSC. If a team has been allowed to use a filter IC, a PSSC about filtering data, as done automatically by the filter IC, is not an acceptable PSSC.

A primary shortcoming of the violating PSSCs described above is a lack of detail in the PSSC. To improve the PSSCs and make them valid, one of the most common methods is to add detail to the PSSC in question. Instead of writing “An ability to send and receive data over a wireless interface” (an invalid PSSC), a valid PSSC could detail the types of data a team expects their system to collect and send over such an interface (an improved and probably valid PSSC).

Far more examples exist than can be reasonably listed here. If in doubt, follow the two golden rules when it comes to PSSCs. First, if a team thinks a PSSC is too easy, and is being done entirely by a component, it is likely that that PSSC will be invalid under this rule. Second, if a team has any doubts about a PSSC, ask course staff for further clarification.

2.3 Embedded Hardware Focus of PSSCs

ECE477 is embedded systems senior design. As such, the course is developed around embedded hardware, and the ABET outcomes for the course reflect this fact. Therefore, in order to be eligible for satisfying the educational outcomes of ECE477, PSSCs are required to be based upon the embedded hardware implemented by the senior design teams.

A common issue students encounter related to this rule is to have PSSCs that are performed on a general-purpose computer. PSSCs related to software written for a general purpose software, such as GUIs, web-interfaces, etc. are invalid for the purposes of this course. A caveat to this rule is added for projects deemed to be motherboard projects, described in section 2.4.

2.4. Motherboard Projects

In recent years, microcontrollers and embedded systems have grown ever-more sophisticated. In an attempt to incorporate this facet of the electronics industry, students may elect to have their project be a motherboard project. A motherboard project is one that uses a student microcontroller, but additionally incorporates an embedded motherboard for additional processing capabilities. Whether or not a project is valid for consideration as a motherboard project is left to the sole discretion of the ECE477 course staff.

If such a project is performed, up to 2 of the 3 project specific success criteria can be based on functionality on the embedded motherboard, subject to the component functionality rule detailed in section 2.2. It is important to note that the remainder of the project-specific success criteria need to be based on the microcontroller and the team-created embedded hardware (circuit board, etc.). Additionally, for a motherboard project, 2 of the 3 PSSC needed to satisfy the course outcome must be related to the embedded microcontroller and hardware (1 PSSC from the motherboard can be used towards satisfying this outcome in motherboard projects).