

2023/2024 – Elektrotechniek – Semester 2

Study Guide Project Smart Energy Devices – (E-PROJE4-22) – 5 studiepunten

Course Organization

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E-PROJE4 -22	Name	Course Structure	Semester	Contact Hours	Self-Study Hours	Assessment Method
PROJE4-pj1	Project Smart Energy Devices	Project	2	20	8 per week	Cumulative

Required Knowledge

Pre-requisites

This project requires a diverse skill set and students should be comfortable with all of the course work in the first 3 semesters of the HHS Elektrotechniek program. However, students should in particular be up-to-date with the material of the following courses:

- UCPRG (micro-controller programming)
- ELEFI1 and ELEFI2 (electronic circuit theory, transistors)
- INGVH3 (project management, requirements and testing)

Co-requisites

Students are expected to be learning the material from the following course(s) simultaneously:

- HFTECH (PCB design)

Course Description

The term Smart Energy Devices can be used to describe a broad range of products which are aimed at using intelligent embedded technology to improve efficiency and save energy within a specific application. This can include simple products like smart home energy meters, as well as more complicated equipment such as the sensors and controllers within smart power grid equipment and even electric vehicles. With this in mind, the students are asked to work in groups to design, build and

test a smart energy device that includes software for an embedded microcontroller as well hardware implemented on a custom printed circuit board (PCB). This course will be delivered in English and student deliverables are also required to be in English.

Course Materials

Required: PROJE4 Course Manual (available on course website)

Learning Goals

1. The student can understand a design problem and make a project plan of approach to ensure that the project requirements are met
2. The student can work as part of a group in order to solve a design problem, including participating weekly meetings and sharing workloads
3. The student can design, assemble and test a PCB design.
4. The student can design, test and debug microcontroller code for an embedded system
5. The student can design, build, test and debug electronic circuits
6. The student can clearly and concisely present their work both orally and in a written technical report in the English language

Assessment, Grading and Competencies

The assessment and grading of students in this course will be done in a cumulative manner. There will be 4 moments of assessment with increasing weight. The first assessment is worth 10 points, the second 20, the third 30 and the final assessment will be 40 points. Specific details regarding the requirements for each assessment and a more detailed grading scheme will be provided in the project manual and on the course webpage.

Students are also required to demonstrate the following 3 competencies at the indicated levels:

- Analysis (level 2)
- Design (level 2)
- Realization (level 2)

For more information on the definition of the competencies and their associated levels, please refer to the documentation on www.hbo-engineering.nl (see link in the footnote ¹).

Numerical Grade: The focus of the numerical grading will be on the quality and depth of the technical work. A group who achieves strong technical results and displays solid engineering skills (but perhaps a less polished presentation) will earn a higher grade than a group with better presentation and writing skills, but with a significantly less challenging technical design. The total numerical grade is determined

¹ https://www.hbo-engineering.nl/_asset/_public/competenties/Bijlage-5-landelijk-eindniveau-hbo-elektrotechniek-13-jan-2014-versie-10-2.pdf

by dividing the total number of points from the cumulative assessments (i.e. out of 100) by 10. If the grade is lower than 5.5, the student does not pass the course.

Competency requirement: A student who fails to demonstrate that they have sufficiently achieved the required competencies will receive a grade of NVD.

Participation Obligation: There is also a participation obligation that applies to the project. This is an obligation of effort on the part of the student that entails the following:

- A proactive, professional and result-oriented work attitude throughout the duration of the project.
- An active presence at the project meetings, with and without a supervising instructor.
- A demonstrable contribution to the group product.

If this participation obligation is not met, a student will receive a grade of NVD.

Removal from Project Group If a student fails to actively participate and contribute to the group activities at a level that is satisfactory to the other group members and/or the supervising instructor, the issue should be raised in a group meeting which includes the supervising instructor. The student will be given the opportunity to change to their behavior within an agreed upon time period. If the student again fails to meet the expectations of the group, the supervising instructor has the ability to remove the student from the project group and assign a final grade of NVD to the student.

Re-sit (Herkansing)

In the general case, there will be no re-sit opportunity for the project. However, it is possible that there are special extenuating circumstances (such as illness) that result in an individual student or group achieving either a total grade of less than 5.5 or an NVD for the course. In this scenario students can submit to the course instructors a written request for a re-sit opportunity. This written request must explain the reason(s) for their inability to meet the project requirements and must be submitted within 2 days of the final assessment date. If a re-sit opportunity is indeed granted, the individual student or entire group will at that moment be given further instructions regarding the specific requirements of the re-sit and the expectations for achieving a passing grade.