**TO:** The Faculty of the College of Engineering

**FROM:** Vertically Integrated Projects (VIP) Program of the College of Engineering

**RE:** New Undergraduate Course VIP 37900

The faculty of the College of Engineering Experiential Learning Curriculum Committee have approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

**VIP 37900 – Participation in Vertically Integrated Projects (VIP) 0**
Terms offered Fall, Spring, Summer, Lecture 0, Lab 0, cr. 0.
Requisites, Restrictions, and Attributes: Permission of Instructor required.

**Description:**
This course provides an opportunity for undergraduate students to engage in authentic and extended research and design projects related to active research areas of Purdue faculty members and national, international, and industry-sponsored design challenges. Students will work on interdisciplinary and vertically-integrated teams (first-year through seniors) with faculty and graduate student mentors to address these real-world research and design challenges. Typically offered Fall Spring.

**Reason:**
To support the participation of students in projects at the 0-credit hour level in order to facilitate the management of students who elect to participate without academic credit.

*Signature*

William C. Oakes
Assistant Dean for Experiential Education
150th Anniversary Professor
Director, EPICS Program
Professor, Engineering Education

**Required Text(s):** None.

**Recommended Text(s):** None.

**Learning Objectives:** Students in VIP will make progress on each of the learning outcomes listed below:

i. an ability to apply engineering design to create a product[1] 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.

**Assessment Method for Learning Objectives:** Each student will be required to document their individual and project work, contribute to the project goals, and participate effectively as part of the project team. Students will be evaluated individually and as part of their team on the basis of their individual documentation and assignments, participation in weekly lab meetings, project artifacts (e.g., code, prototypes, etc.), presentations (e.g., weekly, midterm, final, and/or poster), project documentation (e.g., final project report, poster, etc.), self-assessment, and peer evaluations.

**Lab Outline:**

| Week | Major course milestones |
|---|---|
| 2 | Team Organization and Semester Planning |
| 3 | Personal Semester Goals |

[1] "Product" refers to any device, system, process, software, etc. resulting from this VIP/design experience.

| | |
|---|---|
| 4 | Project Proposal (new projects); Project Demonstration (continuing projects) |
| 5 | Review of Individual Documentation |
| 8 | Peer Evaluation and Self Assessment |
| 9 | Progress Report |
| 11 | Poster Presentation |
| 15 | Final Project Presentation, Team Report; Review of Individual Documentation; Peer Evaluation and Self Assessment |

**VIP Syllabus Spring 2024**
**VIP Team: SoCET**
VIP 17911, 17920, 27920, 37920, 47920, 47921, 47922
https://engineering.purdue.edu/vip/
Also applies to **ECE49600/69600**

## Course Information

- **CRN:** see https://engineering.purdue.edu/vip/register
- **Meeting day(s) and time and Instructional Modality**
  - **Lecture**: Hybrid (Professional Development)
  - **Lab (Team): Instruction Modality**: Normally Face-to-Face, Sync-Online when necessary
  - **Lab (Team) Meeting day(s) and times**: Main team meeting Thursdays 6-6:50pm. Sub-teams will schedule working meetings based on student schedules.
  - **Lab Meeting Location/Information**: WALC1087. Remote access links will be emailed to the team in advance of any meeting.
- **Dates of instruction:** Jan 8th– April 27th (Finals April 29 – May 4th). Note: Course will not meet on March 14th
- **Course credit hours:**
  - Two credit hours: VIP 17920, 27920, 37920, 47920, 47921, 47922
  - One credit hour: VIP 17911
  - Variable credit, variable title ECE49600 / ECE69600 independent study credit
  - Zero credit for ENGR 39600 Jr Level Vertically integrated (for undergraduate volunteers)
  - Zero credit for ECE 49600 SCALE SoCET (paid SCALE interns)

## Course Description

This course provides an opportunity for undergraduate students to engage in authentic and extended research and design projects related to active research areas of Purdue faculty members and national, international, and industry-sponsored design challenges. Students will work on interdisciplinary and vertically-integrated teams (first-year through seniors) with faculty and graduate student mentors to address these real-world research and design challenges. Students will participate in weekly lectures and professional development activities that include topics related to design, research, documentation and technical writing, communication, leadership and teamwork, ethics, project management, intellectual property, information literacy, and introduction to a broad range of applicable research topics, technologies, and development tools.

**[ECE49600/69600 independent study credit students]** This syllabus is applicable to SoCET team participants who are registered for independent study credit. Some gradable items will only be applicable to VIP students. This will be indicated later in the syllabus.

**[0 credit ECE 49600 SCALE SoCET]** Parts of this syllabus are also applicable to zero credit SCALE interns Assessment (satisfactory/unsatisfactory) of SCALE interns is limited to participation, design logs, and progress toward goals.

[0 credit ENGR 39600 Jr Level Vertically Integrated (i.e., volunteers)] Parts of this syllabus are also applicable to zero credit SoCET VIP volunteers. Assessment (satisfactory/unsatisfactory) of volunteers is limited to participation and contributions to achieving team goals. Expectations of volunteers are minimal, but even

volunteers should be participating in over half of team meetings and there should be evidence that they are helping or contributing to the efforts of at least one project or subteam.

## Contact Information

- VIP Program email: vip@purdue.edu
- **Program Directors and Lecture/Professional Development Instructors**:
    - Prof. Carla Zoltowski (Director): cbz@purdue.edu
    - Dr. Nichole Ramirez (Assistant Director): Email: nramire@purdue.edu
    - Office Hours: Email to schedule
    - For general VIP questions: vip@purdue.edu

- **VIP Team SoCET Instructor(s)/Mentor(s):**
    - Instructor: Dr. Mark C. Johnson, mcjohnso@purdue.edu, see https://engineering.purdue.edu/Mark-Johnson for office hours in BHEE248
    - Instructor: Dr. Matthew Swabey, maswabey@purdue.edu
    - Graduate TA: Abinands Ramshanker, aramshan@purdue.edu
    - Graduate TA: Boyuan Chen, chen3075@purdue.edu
    - Undergraduate TA: Max Michalec, michalem@purdue.edu
    - Undergraduate TA(TBD): Julian Kang, bjkang@purdue.edu
    - Volunteer Mentor (Analog, Mixed Signal): Sutton Hathorn, shathorn@purdue.edu
    - Volunteer Mentor (Analog, Mixed Signal): John Peterson, peter178@purdue.edu
    - Research Assistant/Mentor (PCB): Rauf Erkiletlioglu, rerkilet@purdue.edu
    - Research Assistant/Mentor (Digital, Software): Cole Nelson, nelso345@purdue.edu
    - Research Assistant/Mentor (CSME): Isaac Hagedorn, ihagedo@purdue.edu
    - Research Assistant/Mentor (Digital, Software): Ryan Montsma, rmontsma@purdue.edu
    - Research Assistant/Mentor (Intro to SoCET): Jude Pinto, pinto8@purdue.edu

- As a member of the team, you will be assigned to one or more sub-teams and those sub-teams have leaders. As a member of the sub-team, you are responsible for following the direction of that sub-team leader. If you have any concerns about the operation of the sub-team, please contact Dr Johnson.

## Getting SoCET team support

Boyuan Chen/Abinands Ramshanker or your sub-team leader is usually the first person to contact if you need resources or assistance (given the matter is outside of the expertise/ responsibilities of your sub-team lead). This should not stop you from emailing Dr. Johnson, but there is a good chance Dr. J will direct you to Boyuan/Abinands or your sub-team lead for many issues.

Following are guidelines for project support requests that will enable team leaders and even other team members to be the most effective in giving help.

1. A Direct message in Slack. Screenshots of error logs, files, simulations, layouts, etc. are greatly appreciated
2. If it is the morning after you have messaged team leaders on Slack (assuming you sent the message before 4pm ET) and he has not responded, please send him an email with "**WAITING**" in the subject line of the email. In the body of the email please:
   a. Mention how long you have been stuck & unable to resume progress.
   b. Provide an estimation for how much time a team lead should spend to resolve/ learn more about the issue (If you have no clue, write: 1 hour).
   c. Give your best guess for what you think is wrong. If possible, please include weblinks that have guided your understanding of the problem. These links are not required, but they will help everyone get brought up to speed!
   d. State whether you have another task that you can work on while waiting to hear back. If you don't have a good backup task, there is a good chance we will have something for you to research that would benefit the team once the new information has been documented/ presented. We've discovered some amazing EDA tools and ideas for future projects this way.

      An example:
      **Subject:** WAITING: Need help with FPGA compilation
      **Body:**

      i. I first got the error around 3pm yesterday, and I began to feel like I was stuck around 4pm.
      ii. 1 hour
      iii. I think it has something to do with the way that Quartus handles for loops? https://stackoverflow.com/questions/31502324/loop-naming-in-systemverilog-with-quartus
      iv. I don't have a task to work on in the meantime. My interests include learning more about FGPAs and Machine Learning. I'm also considering taking ECE 46800 next semester!

## Learning Outcomes:

All students in SoCET, will make progress on the VIP program learning outcomes listed below, but **this progress is only assessed for students registered for non-zero VIP academic credit.** A student who successfully fulfills the ECE senior design requirements will have demonstrated all of the following outcomes over the two senior design semesters:

i. an ability to apply engineering design to create a product (e.g., device, system, process, software, etc.) 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. **[Assessed only for VIP students, but such responsibilities must be taken into account by all team members]**

## Project goals specific to SoCET:

The overall technical goal of the SoC team (AKA SoCET) is to produce a family of microcontrollers on custom silicon for which the architecture and implementation is entirely under the control of the SoC team so that it can be adapted to whatever needs arise. The general target is to evolve the SoC design to the point where students can use to implement embedded system projects that call for a general-purpose microcontroller. However, potential project sponsors or research collaborators may present requirements to which the SoC can be adapted.

The technical tasks of the team encompass a wide range of technologies and design/implement/test techniques including but not limited to:

1. The core logic design includes an instruction processor currently based on the RISC-V instruction set, system data busses such as AMBA AHB-lite and APB, and a variety of peripheral modules and interfaces. The core logic is implemented using Register Transfer Level (RTL) System Verilog code.
2. Some components of the SoC design may be done at the transistor level and will require full physical layout and verification. Such components may include test structures, custom I/O pads, and analog interfaces.
3. A verification framework written primarily in System Verilog is created and maintained in order to rigorously verify functionality of all parts of the core logic. Verification techniques based on Universal Verification Methodology (UVM) are applied.
4. Design for Test (DFT) and automated test features are integrated into the SoC designs to enable thorough post-manufacturing testing.
5. A software development framework is created to enable the efficient programming of the SoC team microcontroller design.
6. FPGA prototypes of the SoC design are used as a means of testing, demonstrating, and using the SoC team microcontroller design. Even though production of custom silicon is one of the goals of the SoC team, FPGA is also a very practical means for using the team's design.
7. Printed circuit boards are implemented in order to test, demonstrate, and use the SoC team microcontroller.
8. Use a code repository management system such as "git" to manage design data.
9. Prepare documentation for the benefit of current team members, future team members, and other users of the SoC design.

The educational goal of the SoC team is to give all team members a project experience that comes as close to an industry style development team as we can make it. The industry experience includes team management, data and repository management, documentation, and application of industry grade design verification techniques.

## Software Tools

The software tools will vary based on the project. However, in general, the course and teams will use the following software tools:

- **[SoCET] SharePoint home page:** https://purdue0.sharepoint.com/sites/ENGR-ECE-O-SOCET is the primary source of SoCET team technical and administrative documentation. (If you need to access

this page from an off-campus network, you will need to use a VPN service offered by your campus. Please refer to your campus VPN documentation for help setting that up.) At the end of 2023, Purdue phased out Confluence Wiki which was the previous location for SoCET documentation. All of the Confluence SoCET Wiki contents have been migrated to SharePoint.

- **[SoCET] Teams** is used extensively to coordinate work by the subteams. See bottom of the SoCET home page for details.
- **[SoCET]** A wide variety of IC design and simulation tools, depending on one's project and subteam
- Brightspace: Within Brightspace, you will have access to course announcements, schedules, assignments, grades, feedback, and course resources. *Preferred browser:* ITaP recommends Google Chrome or Mozilla Firefox when accessing Brightspace.
    - For Overall Course Announcements and Professional Development (PD) opportunities: Fall 2023 VIP PD - Merge
    - For lab/team: Fall 2023 VIP *SoCET* - Merge
- **Teams** for online meetings:
- Click here to join the meeting
- Meeting ID: 211 759 448 999
- Passcode: 3v2oM6
- CATME: You will use CATME to submit information used for Peer & Team Evaluations (Link to CATME).
- MS Office: Word, Excel, and PowerPoint.
- Adobe: PDF.
- Qualtrics surveys

## Other Team Resources and Texts

- Required texts: There are no required texts for participation in this team, but sometimes, resources will be identified for your study and reference.
- ** Remote access: Compute servers that permit remote access to desktop sessions are available. See https://engineering.purdue.edu/ECEIL/Lab_Support/EDA/thinlinc.html for details.
- Additional readings: For RTL design (after ECE337) on larger projects "The Simple Art of SoC Design" by Michael Keating https://link.springer.com/book/10.1007%2F978-1-4419-8586-6 is very helpful.
- FPGA development boards: These will be issued as needed to team members.
- Lab bench space and instrumentation: Made available on an as needed basis.

## Attendance Policy

The most recent updates related to attendance includes the addition of a Medically Excused Absence Policy for Students (MEAPS) among reasons to be granted an excused absence from class – in addition to Grief/Bereavement, Military Service, Jury Duty, Parenting Leave. MEAPS guidelines are covered in the Attendance section of Academic Regulations, and some clarification is offered on the ODOS website, since students must work with ODOS for any of these excused absences. MEAPS may be an option for students who must miss class for emergent or urgent care.

Within the VIP course, you will be working in teams on a project. Your project work, both individually and as part of the team, is the most significant aspect of the course. Thus, you are expected to participate in all scheduled (virtual or in-person) VIP team meetings (the lab portion of your VIP course), as well as any sub-team meetings. Meetings will be conducted via in-person or virtually on WebEx, Zoom, or other tool(s) as designated by your VIP team mentor and/or decided by you and your project team. This expectation aligns with Purdue's academic regulations regarding attendance, which states that students are expected to be

present for every meeting of the classes in which they are enrolled. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, you should inform the team mentors (instructors) and teammates of the situation as far in advance as possible. Furthermore, you are responsible for knowing what occurred in that meeting (typically by discussing it with other team members) and how you can contribute to the project and team until the next meeting. An excused absence does not relieve you of that responsibility.

For unanticipated or emergency absences when advance notification to the team mentors (instructors) is not possible, you should contact the instructor as soon as possible by email or phone.

If you are unable to make direct contact with the instructor or to leave word with the instructor's department because of circumstances beyond the you, and in cases falling under excused absence regulations, you or the your representative should contact or go to the Office of the Dean of Students website to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted for cases of grief/bereavement, military service, jury duty, parenting leave, and emergent or urgent care. For details, see the Academic Regulations & Student Conduct section of the University Catalog website

## Graded Assignments

Most assignments are due Sundays at 11:59pm at the end of the indicated week. Details on these assignments, including a schedule of due dates, **rubrics** to guide evaluation, and guidelines for participation and documentation will be posted on Brightspace. VIP students registered for zero-credit will only be assessed on participation and progress on project.

| Assignments & Projects | Due Week [Due Date] |
|---|---|
| SoC Topic Presentation or Video | Weeks 3-12, usually in team or subteam meeting |
| Project Overview, Goals, Timeline | Week 2 end of week in design log |
| Completion of VIP midterm documents/surveys **[VIP ONLY]** | Week 8 end of week |
| Weekly Design log – midterm (weeks 3-8) and end of semester weeks (9-15) | Due before team meeting each week |
| Participation – midterm and end of semester | Every team meeting |
| Progress on project – midterm and end of semester | Continuous |
| End of Semester completion of VIP requirements, documents, surveys **[VIP ONLY]** | Week 15 end of week |
| End of Semester Wiki Documentation [VIP] | Wednesday 11:59pm of Finals Week |
| End of Semester Individual report [VIP] | Wednesday 11:59pm of Finals Week |
| **[ECE49600/69600] Independent study report, includes SCALE interns** | Wednesday 11:59pm of Finals Week |

- **SoC Topic Presentation:** Starting the 3rd week non-zero credit students should arrange to present on a System-on-a-Chip related topic.
    - The topic can be related to the task you are working on under a specific sub-team. New members on the 'Intro to SoCET' sub-team can select a topic that can present what they have learned in the Intro tutorials or research to present a topic of general interest to the team, subject to mentor or instructor approval.
    - The presentation should be at least 10 minutes long and be in the form of a PowerPoint. If you want to do the presentation as a group, each member should present for at least 7 minutes.
    - If your project requires you to give a design review, that can take the place of this presentation. A design review is significantly longer and more detailed than the normal topic presentation.
    - If you do not volunteer or it is not possible to present to the entire team, you may present either to your subteam or prepare a video.
    - Do not assume your audience has the same background as you. Make sure to include any background material that would be useful to others.
    - Submit the topic and date you presented it, on Brightspace via the scheduled assignment.

- **Project Overview, Goals & Timeline:** Once you are on the team and given your project you will need to post the following at the top of your design log:
    - Overview explaining what your project is.
    - What are your specific goals for this project.
    - What is the timeline you anticipate to complete the goals.
    - The goals and timeline you post may change overtime and this is all right. But you need to set a timeline for yourself and be able to explain why it changes if you are unable to meet your deadlines.

- **Design Logs:** They are an important part of SoCET. Think of your design log as a notepad where you take notes as you work through problems. You should document things like what you are trying to do, how did you do it, did it work, what are the results, did you use any references. This way if you or another SoCET student needs to look back on what has already been tried and follow your logic they can. Your design log grade will reflect how well you follow these rules:
    - This is a part of your grade so update it weekly.
    - Include details and results for tasks, as well as approximations for how much time you spent on each task - this should not just be a list of tasks.
    - At the top of the page include your goals for the semester and a general overview of what you are doing, with your most recent updates above the others (newest at the top oldest at the bottom)
    - **For volunteers, the design log is not mandatory, but is still highly recommended and may be used to provide evidence of contribution to the team effort.**

- **Participation (Attendance):** You will be graded on your attendance of the online general Thursday meetings and sub-team specific meetings **(accommodations for time zone**

**differences, COVID, and scheduling conflicts will be taken into consideration).** The purpose of this grade is solely to encourage students to make it to the Thursday meeting - so that they are in the loop with the rest of the team.. This grade will be based on the following:

- In your design log, you will add notes highlighting what you learned in the meeting and comments or questions about the content. This will be part of design log grading.
- To receive full credit, you must attend all weekly meetings unless excused, and ten of those meetings must be in person unless excused. Excused absences or virtual attendance will be granted for exam conflicts, illness, and other unavoidable conflicts, but you must notify the head GTA of the situation.

- **Progress:** This is an evaluation of whether you are on track to completing your outlined semester objectives. Participation in sub-team meetings is also factored into this grade. Remember that unexpected roadblocks are considered. For example, if it took 3 weeks to finish a task that you expected to finish in 1 week due to the complexity of the problem, your grade will not suffer provided that your mentor or instructor are aware of the situation as it happens and agree to adjust the expectations. This grade's intention is to reflect whether or not you have made contributions each week that gets you closer to completing your goals for the semester.

- **Poster Presentation:** Near the end of the semester, non-zero credit VIP students will be required to present a poster of your work thus far at an undergraduate research symposium. Other undergraduates have the option of presenting if they so choose.
  - Who will you present with?
    - If you are on a Sr. Design team your group will create your own poster focusing on your senior design project.
    - If you are not a Sr. Design VIP student, you will create a single poster for the entire sub-team.
  - Poster
    - A single PowerPoint slide
    - The end of the semester version will be submitted to the undergraduate research expo.
    - The undergraduate research expo version will require a 10 min audio file.
    - If you are a graduate student collaborating with an undergraduate team, your work can be included in the undergraduate poster.
    - If you are a graduate student working alone or with other graduate students, prepare a poster and give a 10-minute presentation of the poster to the team OR give an SoC topic presentation to the team.

- **Mid & End of Semester VIP Requirements:** Towards the middle and end of the semester you will be expected to complete the following through the VIP Brightspace page.
  - Personal Development Plan progression
  - Self-reflection & progression paper
  - CATME Survey

- **SoCET SharePoint Documentation:** The SharePoint documentation is to function as a kind of spec sheet describing your contributions to the project. The purpose of this is to maintain

documentation of what is under development on the chip so future students can read the wiki page, understand what is being developed, what are the goals and what development status is now. If documentation on your work already exists do not create a new page for it, just contribute to the existing page. If you developed something as a team then you all should work on the documentation together, you do not each need to make your own documentation. Submit the links to your wiki contributions on Brightspace via the scheduled assignment.

- **[VIP-SoCET and SCALE SoCET] Individual report.** A 2-4 page document that is a self-assessment of your accomplishment and what you learned. Sample reports are provided.

- **[ECE49600/69600] Independent study report:** The school of ECE has instituted requirements to standardize expectations for all independent study credit. Most of those requirements such as a design log and weekly meetings are part of SoCET, but independent study students are now expected to prepare a 25-30 page report of their work. The content of this report can be the same information posted as Wiki Documentation, formatted in the style of a report.

## Grading

Grading for SoCET includes general VIP requirements, but the grade computation scheme is specific to SoCET. The sub-team leaders will be assist in the assessment of your performance , but final grades will be determined by Dr Johnson and the GTAs, Abinands/Boyuan.

The number of credit hours are not directly entered into the grade calculation. Instead, your final goals for the semester will be considered when deciding on final goals for the semester and in our assessment of your progress towards those goals. During the semester, if the goals prove to be either too demanding or too easy relative to your academic level and number of credit hours, team leaders will work with you to recalibrate your goals.

Each gradable item will be given a letter grade mapped to points in overall grade calculation. +/- grades may be assigned if quality of work falls in between the categories below.

above and beyond requirements = A+
Meets/exceeds all requirements = A
Meets requirements with minor deficiencies = B
Requirement is completed, but significant room for improvement = C
Required item was attempted but does not satisfy any requirements = D
has done little or nothing = F

When computing a final score, each item will receive a percentage credit based on the following table. A Except for an A+, +" will add 5% to the grade, "-" will reduce the credit by 5%

| Letter grade for graded item | % of possible points to be awarded |
|---|---|
| A+ | 105% |
| A | 100% |
| B | 85% |

| | |
|---|---|
| C | 70% |
| D | 55% |
| F | 0% |

At midterm and end of semester, your overall score for the semester will be graded according to the following weights.

| Assignments and projects | Weights (VIP) | Senior Design | Weights (ECE496/696) | Weights (0 cr vol) | Weights (SCALE) |
|---|---|---|---|---|---|
| Week 1 Set-up + Project Overview, Goals, Timeline included in design log grade | n/a | n/a | n/a | n/a | n/a |
| [VIP ONLY] Mid-Semester VIP Requirements. Penalty if not complete | [-5] | [-5] | n/a | n/a | n/a |
| 1st Oral presentation to team or subteam | 5% | 5% | 5% | n/a | 10% |
| 2nd Oral presentation or poster presentation | 5% | 5% | 5% | n/a | 10% |
| Design logs | 25% | 20% | 20% | n/a | 20% |
| End of Semester Participation | 15% | 10% | 10% | 30% | 10% |
| End of Semester Progress | 40% | 40% | 40% | 70% | 40% |
| [VIP ONLY] End-Semester VIP Documents, surveys. Penalty if not complete | [-5] | [-5] | n/a | n/a | n/a |
| [SENIOR DESIGN ONLY] End of Semester Learning objectives *i through vii* | n/a | 10% | n/a | n/a | n/a |
| Final Documents (individual report & Wiki) | 10% | 10% | 20.00% | n/a | 10% |
| Total | 100% | 100% | 100% | 100% | 100% |

When the total score is computed, the final letter grade will be assigned on the following scale. "+" or "-" grades may be assigned for a score that is slightly below a breakpoint.

| Percentage Range | Letter Grade for regular VIP and ece496/696 | Satisfactory / Unsatisfactory for SCALE | Satisfactory / Unsatisfactory for volunteers |
|---|---|---|---|
| >= 100 | A+ | Satisfactory | Satisfactory |
| >= 95 | A | Satisfactory | Satisfactory |
| >= 80 | B | Satisfactory | Satisfactory |

| | | | |
|---|---|---|---|
| >= 65 | C | Instructor discretion | Satisfactory |
| >= 50 | D | Unsatisfactory | Instructor discretion |
| >= 50 | F | Unsatisfactory | Unsatisfactory |

Mid-semester and end of semester VIP requirements include:

1. Document individual contributions to the project and team in format as required by your project mentor(s).
2. Contribute as appropriate to project documentation, presentations, publications, and/or poster
3. Submit Professional Development plan by Friday, September 9th at 11:59 pm and complete PD activities, including the Welcome to VIP lecture.
4. Complete mid-semester Individual Performance Evaluation (IPE) by Friday, October 7th at 11:59 pm in Brightspace.
5. Complete Final Individual Performance Evaluation (IPE) & PD Reflection (PDR) by Friday, December 9th at 11:59 pm in Brightspace.
6. Complete mid-semester and final peer evaluation of team members in CATME (mid-semester due Friday, October 7th at 11:59 pm and final peer evaluations due Friday, December 9th at 11:59 pm.
7. Complete final Purdue course evaluation and submit screen shot of completion to Brightspace (due Friday, December 9th at 11:59 pm).

## Professional Development (PD) Plan

To support your success on your project and your team, and overall, in your career and your life, you will create an individualized Professional Development Plan. For all students *except* for those enrolled in VIP 17911 or 17912, the plan is expected to incorporate ten (10) Professional Development (PD) activities that can be completed throughout the semester and include the three required activities: the Welcome to VIP "lecture" and the two Communication activities (the abstract submission and participation in the research conference). For students enrolled in VIP 17911 and 17912, the PD Plan only needs to include the *three* required activities. Typically, VIP students participate in the Purdue Undergraduate Fall Research Expo through the Office of Undergraduate Research to complete the abstract and presentation requirements. *A team's advisor may opt for them to participate in a different conference or venue to satisfy the requirement. Please see your VIP Team Expectations at the end of the document for more information.*

| Track/Topic* | Activity | Organizing unit | Date (of activity or expected participation) |
|---|---|---|---|
| 1. PD (Required) | Welcome to VIP | VIP | Complete by Friday, September 2nd |
| 2. Communication (Required) | Research Conference – Application submission | OUR | See Purdue Undergraduate Fall Research Expo Website |
| 3. Communication (Required) | Research Conference – Poster/Oral Presentation | OUR | Poster/oral presentations: November 14, 2023<br>See Purdue Undergraduate Fall Research Expo Website |

***The remaining seven activities are to be chosen by the student, depending on their interest and what would be most beneficial for their work on a specific team***. Please see the Team Expectations Section below for specific suggestions for this team.

VIP is working with other programs to compile an expansive library of Professional Development videos along with access to interactive workshops, live presentations, etc. Students should browse the materials and talk with their mentors during the first week of the semester to create their individual Professional Development (PD) Plan. The PD plan should be submitted on Brightspace by **Friday, September 9th**. Students may update their plans as needed during the semester without resubmitting to Brightspace.

Students will be expected to document their participation in each of the activities via the assignments posted in their team Brightspace, as well as in the Midsemester Individual Performance Evaluation (IPE) and the Final IPE & PD Reflection assignments.

## ECE Senior Design Students

In addition to the above requirements and expectations, senior design students must complete the following documents (templates are posted on the VIP website and in Brightspace):

- VIP Senior Design Project Proposal: Must be completed individually by each senior design student during the first semester of Senior Design to ensure he/she has an appropriate project and role. This is to be submitted at the mid-semester and final evaluations during the first senior design semester instead of the Individual Performance Evaluation rubrics.
- VIP Senior Design Project Description: Must be completed during the second semester of Senior Design by each project team. This is to be submitted at the mid-semester and final evaluations during the second senior design semester instead of the Individual Performance Evaluation rubrics.
- VIP Senior Design Reflection, Outcomes, and Rubric (ROR) document: The Senior Design Reflection, Outcomes, and Rubric (ROR) document is submitted at the mid-semester and final evaluations both senior design semesters instead of the Individual Performance Evaluation rubrics.
- Both the Senior Design Project Proposal/Description and the Senior Design Reflection, Outcomes and Rubric document will be used by the advisor(s) and VIP admin to approve the satisfaction of the course outcomes and in determining the course grade.

## Grading for Senior Design Students [in SoCET, this is used for the learning objectives score]

| (Each outcome will be rated on a scale from 1 to 4, where 4 is "Excellent", 3 is "Good", 2 is "Adequate/Acceptable", and 1 is "Inadequate/Unacceptable" | | **Weight** |
|---|---|---|
| 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. | 30% |
| 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. | 15% |
| 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. | 15% |
| 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. | 10% |

| | | |
|---|---|---|
| v. | An ability to communicate effectively with a range of audiences appropriate to this design experience in both a written report and oral presentation. | 10% |
| 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. | 10% |
| 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. | 10% |

## Classroom Guidance Regarding Protect Purdue

Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the Office of the Student Rights and Responsibilities. See also Purdue University Bill of Student Rights and the Violent Behavior Policy under University Resources in Brightspace.

## Academic Integrity and Professional Responsibility

Academic integrity is one of the highest values that Purdue University holds. The VIP Program expects every member of the Purdue community to adhere to the Purdue Honor Pledge ("As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue.") and practice honorable, ethical, and professional behavior both inside and outside the classroom. In VIP, students are encouraged to work together and share information. When indicated, students and teams are allowed to modify previous versions of documents to be submitted for the current assignment. However, it is unacceptable for students to claim individual work that is not their own or to use sources without appropriate citation. It is also unacceptable for students to misrepresent information to their instructional staff, their team, and/or their client. In addition, misuse of VIP resources is considered dishonest. At the instructor's discretion, instances of academic dishonesty will result in a reduced score, a zero score, or a failing grade for the course. All occurrences of academic dishonesty will be reported to the Office of Students Rights and Responsibilities (OSSR) and the students' respective schools. If there is any question as to whether a given action might be construed as academic dishonesty, please see the instructor or the teaching assistant before you engage in any such action.

## Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies.

## Accessibility

VIP, and Purdue University, strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let us know so that we

can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

## Mental Health/Wellness Statement

- **If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack, https://purdue.welltrack.com/.** Sign in and find information and tools at your fingertips, available to you at any time.
- **If you need support and information about options and resources**, please see the Office of the Dean of Students, http://www.purdue.edu/odos, for drop-in hours (M-F, 8 am- 5 pm). Phone: 765-494-1747.
- **If you find yourself struggling to find a healthy balance between academics, social life, stress**, etc. sign up for free one-on-one virtual or in-person sessions with a Purdue Wellness Coach at RecWell. Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect.
- **If you are struggling and need mental health services**: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours. The CAPS website also offers resources specific to situations such as COVID-19.
- **TaskHuman: On-demand access to wellness providers with 1000s of topics, day, or night**
    - Purdue users eligible for unlimited FREE coaching: https://taskhuman.com/referral/purdue
    - Good intro video: https://www.youtube.com/watch?v=eTeq8hApTNg
- **Basic Needs Security:**
    - Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency assistance from the Critical Needs Fund

## Emergency Preparation

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

## VIP Team Expectations: How to Succeed on Team

### What is each student supposed to accomplish?

Each student will have goals for the semester that are specific to each student. These goals will be negotiated between the student and the team advisor with assistance of the student leaders on the team.

In the case of senior design teams, the goals will be established on a per team basis with individual responsibilities determined within the team.

## How many hours/week should each student devote to VIP?

Steady progress is of greater import than the number of hours/week committed. Nevertheless, a typical level of effort would be 3 to 5 hrs/week per credit hour in addition to the regular weekly team meeting.

## What are the expectations regarding attendance at weekly team meetings?

Weekly team meetings are mandatory, but absences may be excused at the instructor's discretion. Depending on the reason for absence, a task may be given that will serve as a make-up for the absence.

## What are the expectations regarding the taking of notes by the VIP students during the weekly team meetings?

Students are not required to record notes at the weekly whole-team meeting, but notes from sub-team meetings, or individual Senior Design team meetings, are to be recorded in the students' design logs on the team Wiki.

## Will notes taken by the VIP students be subject to periodic review by team advisor and/or team mentor?

The student's design log will be assessed at least twice over the course of the semester.

## How is the student expected to document his or her work throughout the semester?

The general format of each student's design log is to be as follows:

- At least one log entry per week that includes an estimate of the number of hours of work,a list of accomplishments of the week, evidence for those accomplishments, and goals forthe coming week.
- Additional entries are encouraged to highlight accomplishments and challenges occurringbetween weekly entries.
- The weekly team meeting will be treated as the deadline for weekly design log updates.

## What are the expectations for the final project presentation?

Every semester, all VIP students on the SoCET team are required to contribute to the creation of a project poster and assist in the presentation of that poster. Typically, this will be at the poster session organized by the VIP program, but other venues such as conferences will be accepted at instructor discretion.

Senior design project teams will be required to give a formal presentation of their project no later than the last week of classes in the final semester of the project. Content of the presentation will be

similar to the outline provided for final reports as provided on the SoCET team Wiki.

### Is a final report required? If so, what is the expected content and format?

Yes. The format and grading rubric for the final report are posted on the SoCET home page on sharepoint (If you don't have access, please reach out to Abinands/Boyuan)

## VIP Team Facilities Standard Operation Procedures (SOP) and Expectations

The VIP Suite is available for scheduled team (lab) meetings, and for other VIP related meetings (see "Reserving VIP Lab Rooms on the Resources page (https://engineering.purdue.edu/VIP/resources). Teams may also be meeting in research labs, classrooms, and conferences room as indicated by your team mentors. All VIP students are expected to comply with the Protect Purdue Plan.

If your VIP team uses your advisors' research lab facilities, information regarding SOP and Expectations will be provided here.