ACADEMIC SENATE
Executive Committee
REFERRAL FORM

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

Date:	Date of next EC meeting…
To:	General Education Committee
From:	Academic Senate Executive Committee
Subject:	Academic Senate Referral
Classification	**GE-002-256**
Title of Referral:	**PLT 4020 - Agricultural Drone Technology (New GE Area 5D)**
Background:	See attached referral request form. Additional background provided by the Executive Committee: New course proposed for GE Area 5D.
Recommended resources:	See attached referral request form and supporting documentation. Additional resources recommended by the Executive Committee: None. For the Committee's Report on this referral, please list in separate sections, the resources recommended, and resources actually consulted. If a resource was not consulted, briefly state why.
Review and recommend:	Review and recommend as appropriate.
Date required for presenting committee report to the Executive Committee:	3/2/2026

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Names and Titles of Proponents:
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Keywords: PLT, 4020, Agriculture, Drone, Technology, New, GE, Area, 5D

Background: Explore how drones are transforming modern agriculture. Learn how to plan and fly safe missions, collect aerial images, and use data to understand crop health, soil conditions, and land features. Classroom learning is combined with hands-on flight practice and mapping projects. Preparation for the federal drone pilot certification exam and application of drone technology to real-world agricultural challenges.

Students will need access to drones, batteries, and flight simulation software provided by the department. No personal purchase of drones is required. Classes will be held in a standard classroom and at designated outdoor field sites which includes AgriScapes farm, SPADRA farm, Huntley Vineyard, and Coffee farm.

By the end of this course, students will be able to:

1. **Explain** the key federal regulations governing drone operations in the United States.
2. **Interpret** aeronautical charts and weather reports to plan safe agricultural drone flights.
3. **Demonstrate** safe and effective operation of drones in both simulated and outdoor environments.
4. **Collect and analyze** aerial imagery to evaluate plant health, soil conditions, and land use.
5. **Apply** geospatial and mapping tools to generate data-driven agricultural insights.
6. **Prepare** for the FAA Part 107 Remote Pilot Certification exam by integrating knowledge of regulations, safety, and flight planning.

All sections of PLT 4020 will include the following core elements:

- **Drone Operations and Safety**
  - Fundamentals of flight planning and safe operations.
  - Compliance with federal regulations governing drone use.
- **Regulatory Framework**
  - FAA Part 107 rules and requirements.
  - Airspace classifications, flight restrictions, and waiver processes.
- **Flight Planning and Weather Analysis**
  - Interpretation of aeronautical charts.
  - Use of weather data (METARs, TAFs) in flight decision-making.
- **Hands-On Flight Practice at Field Sites**
  - Indoor simulator training.
  - Outdoor flight missions conducted at **AgriScapes farm, Spadra farm, Huntley Vineyard, and Coffee farm**.

    - Team-based mission simulations with data collection.
- **Sensors and Imaging for Agriculture**
    - Overview of RGB, multispectral, and thermal imaging tools.
    - Basics of Normalized Difference Vegetation Index (NDVI) and plant health monitoring.
- **Data Analysis and Mapping**
    - Introduction to photogrammetry and GIS integration.
    - Analysis of aerial imagery for crop health, soil variability, and land use.
- **Assessment and Certification Readiness**
    - Midterm and final FAA-style exams.
    - Final project: written Drone Use Proposal applying course knowledge to a real-world agricultural or environmental challenge.

PLT 4020 serves as an **upper-division elective in the Plant Science major** and a **General Education (GE) Area B5 course** in Scientific Inquiry and Quantitative Reasoning. As part of the Plant Science curriculum, the course strengthens technological and analytical competencies that align with the program's emphasis on experiential, polytechnic learning.
The course supports the following **Program Learning Outcomes (PLOs):**

- **PLO 1:** Demonstrate applied knowledge of plant science by integrating biological principles with modern agricultural practices.
- **PLO 3:** Apply scientific methods, data analysis, and critical thinking to solve agricultural problems.
- **PLO 4:** Communicate effectively about plant science using professional, written, and oral formats.
- **PLO 5:** Demonstrate awareness of sustainability and technological innovation in agriculture.

PLT 4020 also fulfills **GE Area B5** by requiring students to:

- Apply scientific inquiry through flight planning, data collection, and analysis.
- Use quantitative reasoning to interpret aerial imagery, geospatial data, and weather information.
- Evaluate the scientific and technological impacts of drone systems on agricultural and environmental decision-making.

PLT 4020 – Agricultural Drone Technology aligns with the **Don B. Huntley College of Agriculture** and the **Plant Science Department's** mission to provide polytechnic, hands-on training that prepares students for leadership in sustainable and technology-driven agriculture.
The Expanded Course Outline (ECO) emphasizes:

- **Experiential Learning:** Students practice safe flight operations, mission planning, and aerial data collection in both simulated and real-world environments.
- **Field-Based Education:** The course leverages Cal Poly Pomona's living laboratories, including **AgriScapes farm, Spadra farm, Huntley Vineyard, and the Coffee farm**, to provide authentic agricultural settings for drone applications.
- **Technology Integration:** Coursework covers sensors, geospatial mapping, and data analysis tools that connect agricultural sciences with engineering and computing.
- **Workforce Preparation:** The ECO incorporates FAA Part 107 certification readiness, ensuring that students leave the course with industry-recognized credentials and practical skills relevant to agribusiness, research, and environmental monitoring.

PLT 4020 addresses the **required GE Area B5 SLOs** through the following assessment methods:

1. **Apply scientific inquiry and quantitative reasoning**

- *Assessment:* Students complete weekly quizzes, a midterm, and a final FAA-style exam requiring interpretation of weather data (METARs/TAFs), aeronautical charts, and quantitative calculations for safe flight planning.

2. **Apply scientific knowledge to real-world problems**
   - *Assessment:* Hands-on flight labs and mission simulations at AgriScapes, Spadra farm, Huntley Vineyard, and Coffee farm require students to collect aerial data and analyze crop health, soil variability, and land use.
3. **Use scientific thinking to analyze problems and draw evidence-based conclusions**
   - *Assessment:* Lab assignments and the final **Drone Use Proposal project** require students to evaluate drone-based imaging and mapping data, justify safety and regulatory decisions, and propose evidence-based agricultural solutions.
4. **Communicate findings in forms appropriate to the discipline**
   - *Assessment:* Students prepare technical lab reports and a final written proposal that communicate flight planning, data analysis, and applied agricultural insights to a professional audience.

PLT 4020 meets the expectations of **GE Area B5: Scientific Inquiry and Quantitative Reasoning** by requiring students to apply scientific methods, use quantitative reasoning, and critically evaluate technological solutions in agricultural contexts. Students learn how to plan and conduct drone missions, collect aerial imagery, and interpret geospatial data to address real-world problems in crop health, soil management, and environmental monitoring. These activities embody the practice of **scientific inquiry** and reinforce the use of **quantitative analysis** to draw evidence-based conclusions.
The course also fulfills the broader **GE program expectations** by:

- **Developing critical and analytical skills:** Students interpret aeronautical charts, weather data, and drone imagery, strengthening their ability to analyze complex datasets.
- **Applying knowledge to contemporary issues:** By using drones in agriculture, students engage with challenges related to food production, sustainability, and environmental stewardship.
- **Fostering communication skills:** Through lab reports, mission plans, and a final Drone Use Proposal, students practice communicating technical findings to professional and community audiences.
- **Supporting interdisciplinary learning:** The course bridges agriculture, environmental science, engineering, and computing, illustrating the polytechnic integration central to Cal Poly Pomona's GE program.

By combining **classroom instruction, field-based labs at AgriScapes, Spadra farm, Huntley Vineyard, and Coffee farm, and a culminating project**, PLT 4020 provides students with a rigorous, inquiry-driven, and applied scientific experience that aligns with the goals of **GE Area B5** and the **university-wide GE program**.

Recommended Resources:

Attachments: