ECE 57000: Artificial Intelligence

Syllabus - Fall 2026

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1 Course overview

Purpose.

This graduate course introduces artificial intelligence broadly through its technical concepts, intuitions, algorithms, and research practices. Methods from machine learning, probabilistic modeling, representation learning, natural language processing, computer vision, generative modeling, reinforcement learning, and related areas serve as vehicles for developing durable principles and technical intuition rather than as an implementation checklist.

The course also addresses effective engineering in the age of AI. As AI makes implementation cheaper, engineers must move upstream: frame worthwhile problems, make defensible value judgments, choose among alternatives, verify results, and take responsibility for outcomes. The course therefore distinguishes **learning** (generalizable understanding) from **doing** (producing an artifact) and uses different evidence for each.

Course	ECE 57000: Artificial Intelligence, Fall 2026
Credits	3
Sections	002 (CRN 34846), 004 (CRN 27733), EPE (CRN 29583)
Meeting	Section 002: Monday, Wednesday, and Friday, 1:30-2:20 p.m., University Church 114
Instructional method	Section 002 in person; sections 004 and EPE online
Official prerequisites	ECE 30200 and ECE 36800
Course website	Course materials and tentative schedule
Brightspace	Official syllabus and private course information
Gradescope	All graded submissions and grades
Piazza	Announcements and course discussion

Instructor: David I. Inouye, BHEE 332, dinouye@purdue.edu, 765-496-0238.

Office hours: Instructor and teaching-assistant office hours will be posted on Piazza once finalized.

Tentative topics and schedule. The separate tentative schedule contains dates. The order and emphasis may change as the Fall 2026 redesign develops. High-level concepts will remain, but specific methods and examples may move or be replaced.

1. AI-assisted work and technical judgment
2. Mathematical and machine-learning foundations
3. Deep learning and learned representations
4. Language, vision, and sequence modeling
5. Probabilistic and generative modeling
6. Decision-making, agents, and AI Product development

2 Catalog information and readiness

Catalog description.

This course will provide a graduate-level introduction to artificial intelligence (AI), which is broadly defined as any method that enables intelligent behavior in computers. Topics may include machine learning, probabilistic methods, representation learning, natural language processing, computer vision, and special topics. The course will cover technical concepts, intuitions, and algorithms and will include basic training in AI research.

Learning outcomes.

A student who successfully fulfills the course requirements will have demonstrated:

- The ability to write programs for artificial intelligence techniques.
- The ability to modify or implement one current artificial intelligence research method
- The ability to write a report on a current artificial intelligence research topic.

Readiness.

The official prerequisites are ECE 30200 and ECE 36800. Informally, the course expects familiarity with probabilistic methods, data structures, linear algebra, Python programming, mathematical notation, statistics, and calculus. These are proxies for the knowledge used in practice. The course will bridge selected AI-specific intuitions, but students remain responsible for refreshing foundational material as needed.

3 Assessment and grading

Assessment	Within category	Course grade
Quizzes (written or oral; lowest two dropped)	-	**10%**
Assignments	-	**10%**
Exams	**100% of Exams**	**40%**
Midterm 1	30% of Exams	12%
Midterm 2	30% of Exams	12%
Final exam	40% of Exams	16%
AI Product	**100% of AI Product**	**40%**
Milestone 1	10% of AI Product	4%
Milestone 2	25% of AI Product	10%
Final deliverable	65% of AI Product	26%
Total		**100%**

No +/- for grades; only letter grades A, B, C, D, or F. Letter grades will be assigned at the end of the semester. The instructor will determine the final grade cutoffs, but the cutoffs will be equal to or lower than the standard cutoffs. The standard cutoffs are A if $\geq 90\%$, B if $\geq 80\%$, C if $\geq 70\%$, D if $\geq 60\%$, and F otherwise (e.g., if you have $\geq 90\%$ you are guaranteed an A).

Quizzes (10%). We plan to pilot oral quizzes in this class. Explaining an idea aloud in your own words helps demonstrate understanding and synthesis while surfacing misconceptions that polished written work or multiple-choice answers may hide. Quizzes may also be written. They cannot be made up. A quiz not submitted within the allowed late window receives a zero, which is why the lowest two assigned quiz scores are dropped. Formats and instructions will be announced in class and on Piazza. Quizzes are normally released by Wednesday night and due the following Monday night; Gradescope shows the authoritative due date and time.

Assignments (10%). There will be approximately three to five assignments or mini-projects between the major AI Product milestones and exams. They may include written, computational, or oral components and may involve analysis, mathematical reasoning, experiments, code reading or modification, critique, and communication.

Exams (40%). There will be two midterms and a cumulative final exam that will place more weight on recent material. Midterm dates will be announced in the course schedule. The final exam time and location have not yet been

released by the registrar. For each exam, students may bring a single 8 1/2 x 11 inch page, both sides, of physically handwritten notes. There must be pen or pencil ink directly on the page. Photocopied or printed notes are not allowed, including notes handwritten on an iPad or other tablet and then printed. Put your name and PUID on the note sheet.

AI Product (40%). The conventional course project is replaced by an individual AI Product whose primary use case depends on an AI component. Each student will identify a **stakeholder**, meaning a prospective user or direct beneficiary, and develop and evaluate the product through two milestones and a final deliverable. Exact requirements and formats will be announced in class and on Piazza or Gradescope.

Bonus: Open-to-all course study groups. Students may earn up to 3 percentage points beyond the 100 course points through optional, completion-based study-group participation. These groups are fundamentally different from private study groups: every group must be open to any student in the course. Meetings should last approximately 30-45 minutes. In-person meetings are strongly encouraged; live Zoom or Teams meetings are allowed for online students and others who cannot meet in person. Remote participants must keep their cameras on throughout the meeting so that the interaction resembles an in-person meeting and supports engagement. Validation may require a photo or screenshot showing all members in live attendance, a meeting transcript, and a recording. Each group will make one Gradescope group submission. Detailed mechanics will be announced in class and on Piazza.

Due dates and late work. Gradescope shows authoritative submission deadlines. For quizzes, assignments, and AI Product deliverables:

- **Up to 1 day late: 20% of the assessment's maximum score is deducted.**
- **More than 1 day late: zero on the assessment.**

4 Learning resources and required technology

There is no required textbook. Optional readings will be linked from the course website.

- **Paid AI access:** Each student is required to maintain either Claude Pro or ChatGPT Pro (typically about $20/month). Claude is the instructor's current preference; ChatGPT is fully acceptable and may offer better usage limits. Free tiers are unlikely to provide enough capacity for the course, and Gemini is not currently a supported replacement. Other tools may be used in addition.
- **Google Colab Pro:** Google Colab Pro is a required course resource. **Students need not buy this immediately but may wait until it is needed.** Free Colab, personal resources, or another environment may be used until an assignment or AI Product requires the paid capacity. Course staff can guarantee support only for the published Colab environment.
- **Computer, smartphone, and microphone:** Oral quizzes may be completed using a computer or smartphone with a working microphone and modern browser. The device must also support uploading course work to Gradescope.

5 Generative AI policy

1. **Quizzes and exams:** No AI use is allowed during quizzes or exams. The goal of these assessments is to test your understanding of the concepts, and AI use would hinder that goal.
2. **Assignments and AI Product:** Responsible AI use is expected. You are the **author of record** and are responsible for every submitted word, claim, citation, decision, line of code, and artifact. The goal is effective AI-assisted work.

Do not enter restricted, confidential, personal, export-controlled, or stakeholder data into an AI service without authorization.

Any assessment may be reviewed manually or with automated or AI-assisted methods for consistency with course and assessment requirements. The instructor and course staff determine authoritative grades.

6 Course practices

Attendance and communication. Students in the in-person section are expected to attend all class periods in person per Purdue's academic regulations. If a student misses a class, the student remains responsible for all missed content and announcements. Attendance does not directly contribute to the course grade. **Piazza is the primary means of course communication.** All students are expected to join the Piazza class by the first day and check it regularly. Piazza will be used for announcements and course discussion. Post questions there instead of emailing the instructor or TAs unless the issue is confidential. Allow one to two business days for a response and ask before the day work is due.

Accessibility and accommodations. Students who want to use disability- related accommodations must release their Disability Resource Center Course Accommodation Letter to the instructor. Students whose letter includes testing accommodations must also **schedule each exam with Purdue Testing Services at least seven days before the exam date**. Students are strongly encouraged to schedule each exam as soon as it becomes available. Contact the instructor immediately if Purdue Testing Services cannot provide the approved testing accommodations.

Academic integrity. Collaboration and AI permissions are assessment-specific. Students may discuss ideas unless prohibited, but may not misrepresent another person's or system's work as their own, fabricate evidence, share restricted assessment content, or provide materially false stakeholder or study-group records. **Any academic integrity violation will result in an F in the course and will be reported to the Office of the Dean of Students.**

7 University policies and support

This concise appendix identifies the institutional provisions that govern the course. Simple Syllabus supplies the current authoritative University language and links; that language controls if this local PDF becomes stale.

Nondiscrimination, conduct, and academic regulations. The course follows Purdue's current nondiscrimination policy, student conduct regulations, academic regulations, attendance rules, grade-appeal process, and student-related policies as linked in Simple Syllabus and Brightspace.

Mental health, wellness, and basic needs. Students may use Purdue Counseling and Psychological Services, ODOS Student Support Services, the Basic Needs program, and emergency resources listed in Brightspace. In an immediate emergency, call 911.

Emergency preparedness. Students are responsible for reviewing Purdue emergency procedures. Course-specific evacuation and shelter locations will be discussed during the first class meeting in each building. During a major emergency, follow PurdueALERT and official University instructions; course requirements may be adjusted as needed.

Course changes and feedback. The schedule, topics, and implementation details are tentative. Changes will be announced through Piazza and, when material, updated in the affected guide or syllabus. Students will receive graded feedback at least twice within the University's required windows. No graded work will be due during the Fall 2026 Quiet Period (December 7-12) because the course has a final exam.