

Dear Students,

I am writing to share my perspective on artificial intelligence and its role in EE461G this semester. I view AI as a powerful modern engineering tool, and I am not opposed to your using it. At the same time, the core of your learning in MOSFETs, BJTs, and diodes will come from doing device analysis and circuit design yourself, on paper, in your own handwriting—and the course is structured accordingly.

Handwritten Work and Exams. Homework assignments in this course are designed to be worked by hand and submitted in hardcopy form. Exams are multiple choice, taken in person, with only two resources available to you: a composition-style bound notebook that you prepare yourself, and an NCEES-approved calculator (which has very limited functionality—no symbolic math, no internet, no programmability). Because composition notebooks are pre-bound, they naturally lend themselves to handwritten notes—it is difficult to insert printed or AI-generated pages. The homework is intended to build the skills you rely on during exams: setting up bias conditions, choosing the correct operating region, drawing small-signal models, and carrying out calculations with a basic calculator. Because the deliverables are pen-on-paper analysis and the exam environment is a bound handwritten notebook plus a limited calculator, AI naturally plays a limited role in these areas—not because it is banned, but because the format itself calls for your own hand and your own reasoning. You are, of course, welcome to use AI to help you learn concepts, explore ideas, or check your understanding as you study.

Role of AI in SPICE Work. The one area where AI is explicitly encouraged to “step in” is as an IT assistant for SPICE. You are welcome to use free AI tools to help you:

- Install and configure SPICE software.
- Interpret error messages and fix netlist syntax.
- Set up basic simulations once you have decided on the circuit yourself.

AI can replace a lot of the technical support that students traditionally need just to get SPICE running and producing plots. However, AI is not a substitute for engineering judgment: **you** are responsible for choosing appropriate device models, defining operating points, and interpreting I–V curves and waveforms. You must be able to explain what your simulations show and how they relate to the underlying device physics and your hand analysis. SPICE-related assignments make up only a small percentage of the final course grade; they are mainly there to help you visualize and test what you already know how to do by hand.

Shift from Simulink to NGSpice. The only substantive change in these assignments compared with my pre-AI semesters is the simulation tool, not the learning goals. In earlier offerings of this course, I required the use of Simulink as a front end for SPICE-like simulation, which many students found inarticulate and overly burdensome to learn relative to the benefit. This semester, I have switched to NGSpice, a free, open-source SPICE implementation that significantly lowers the barrier to entry. The AI component is intended to help you get NGSpice installed and running smoothly, not to change what you are expected to understand about the devices themselves.

Free Tools Are Sufficient. You do not need any paid AI subscription for this course. The level of AI assistance appropriate here—help with installation, error messages, netlist formatting, and simple

simulation setup—can be fully achieved using free AI tools and free SPICE packages like NGSpice. While I may occasionally demonstrate a particular paid product that I personally find convenient, every capability I use in class is also achievable with free accounts. No assignment will require features that are available only in a paid tier, and you are not expected or encouraged to spend money on AI access for this class.

In-Class AI Demonstrations. At times, I will use class time to demonstrate how I use AI to assist with SPICE-related tasks. These demonstrations are meant to show best practices for interacting with AI: how to write precise prompts, how to check for “AI catastrophes” such as hallucinated commands or syntax, and how to verify AI suggestions against documentation, your own understanding, and actual SPICE behavior. You should treat these examples as guidance on safe, critical, and professional AI use—not as advertisements for any particular platform and not as instructions to purchase a subscription.

Use of AI in the End-of-Semester Report. This course includes a single written report due at the end of the semester. Generative AI tools (e.g., ChatGPT, Copilot) may be used as assistants for that report, for tasks such as brainstorming, drafting, or editing. Their use is optional and must be transparently disclosed in a brief AI-use note at the end of your report. That said, AI is not a substitute for your own engineering work. You must be the one who selects circuits, chooses component values, runs and interprets simulations, and explains how and why your designs function. Reports that rely heavily on generic AI explanations without substantive, individualized analysis, schematics, and simulation results will not receive high marks, even if the writing is fluent. Undisclosed use of AI will be treated the same as any other unattributed source under the university’s academic integrity policies.

Overall Expectations. To summarize:

- AI is not banned in this course. You are welcome to use it as a learning aid.
- The handwritten format of homework, notebooks, and exams naturally means that AI cannot produce the deliverables for you—your hand analysis is what gets practiced and what gets graded.
- AI is actively encouraged as an IT assistant for NGSpice—lowering technical barriers so you can focus on the engineering.
- AI may assist with drafting and editing the end-of-semester report, but you must disclose its use and all engineering content must be your own.
- Free AI tools and free SPICE software are sufficient for everything in this course; paid products are optional and not required.
- In-class AI demos are there to help you use AI critically and responsibly, not to promote any particular product.

If you are ever unsure whether a particular use of AI is appropriate for an assignment, please ask for clarification before proceeding. My door is always open.

Sincerely,

Dr. Daniel L. Lau

Student Acknowledgment

I have read and understand the AI policy for EE461G as described above. I agree to abide by these guidelines for the duration of the course.

Printed Name

Signature

Date

Student ID (optional)