Welcome to IE 2250/L

Fundamentals of Human Factors Engineering

# Your Instructor

* Dr. Greg Placencia, (*call me*: Prof. Placencia, Dr. Placencia, Dr. Greg)
* Email: [gvplacencia@cpp.edu](mailto:gvplacencia@cpp.edu)
* Office hours:
  + By appointment (preferred)
  + M: 11 – 12:30 PM (Hybrid)
  + W: 11 – 12:30 PM (Face to face)
  + TTh: 1 – 2:30 PM (Zoom): https://cpp.zoom.us/j/85751578560

# Course Information

## Class Changes

This syllabus may be altered or abrogated to suit the needs of the semester. I will discuss such needs with student and notify them of any changes as they arise.

## Class Format

Asynchronous Preparation: Students review material and do assessments for lectures and labs

## Lecture (Monday)

Instructor and student meet every other week to clarify concepts.

## Lab (Wednesday)

* Synchronous: Instructor and student meet every week in classroom.

## Course Description and Learning Outcomes

Study of human physiological, biomechanical, and psychological characteristics and how they influence engineering and design of equipment, machines, products, facilities, tools, and environments. ADA and OSHA standards.

## Course Learning Objectives

Students successfully completing this course should be able to:

1. Design basic empirical studies to collect human factors data
2. Collect human factors data
3. Analyze human factors data
4. Create data visualization narratives using human factors data
5. Evaluate the usability of engineering designs based on human physiology, biomechanics, psychology, empirical data, and basic OSHA and ADA considerations.
6. Create or improve an engineering design based on human factors engineering principles

## Required Materials

* No Textbook
* See Canvas Modules online for readings and other preparation materials

### Hardware and Software

* Device with online access to learning materials and assessments. Webcam preferred.
* Qualtrics to collect data.
* Jupyter/Anaconda/Python to analyze, evaluate, and visualize data. Alternatively, a spreadsheet program (e.g. MS Excel, Google Sheets, etc.) can be used.
* Word Processor (e.g. MS Word, Google Docs, LaTeX, etc.)
* Scanner software, to submit written work for your quizzes. [Many free apps](https://www.cnet.com/how-to/best-scanning-apps-for-android-and-iphone/) can do this (Adobe Scan, CamScanner, Scannable, etc.). To reorganize a PDF or merge photos into a PDF, [jpg2pdf.com](http://jpg2pdf.com/) is a great website.

## Prerequisites, Co-requisites, and Necessary Skills

* None

# Communication

## Appointments / Office Hours

If you have any concerns related to the course, your progress, or understanding content it can be very useful if we discuss them. I keep office hours, but as schedules differ, it’s much easier if we make an appointment. Remote meetings are acceptable.

To make an appointment student must use Microsoft Office 365 Calendar (<https://outlook.office.com/calendar/view/month>). Check my schedule to ensure availability.

## Email[[1]](#footnote-1)

Synchronous meetings are usually more effective than email exchanges. However, … If you need to email me, please **follow these tips to send an email effectively:**

* Make the Subject Line clear, concise and descriptive:

“IE 2250[x] – [brief description]”

Be sure include your course section.

* Write complete and concise sentences in your email body to communicate your concern, question, or comment. Try to fit the entire message on one screen without scrolling.
* I highly encourage active, professional voice with good grammar and spelling.
* Feel free to include picture attachments if you’re asking about a HW problem!
* If you send any files, label it clearly with your last name and a good description:

“placencia\_ie2250\_lab1\_supporting\_work.docx”

Make sure the file is in a common format (e.g. docx, xlsx, pdf).

* Use a signature with your full name at the end of your emails.

I respond to emails within a 48-hour period Monday through Thursday. I do *not* guarantee email responses on weekends. Please plan ahead accordingly.

*Example*

Subject: IE 2250 – Sharing this video for class

Bottom Line: This video about yesterday’s topic might help others in the class.

Dear Professor Placencia,

I watched this video before class, which helped me prepare for the lecture

I think it can help others in the class understand the topic better too

# Instructor Responsibilities

I want you to succeed. I am here to support you! Some ways I do that:

* Clearly communication timelines/deadlines in class and on the Canvas calendar
* Give prompt feedback on assessments
* Provide opportunities for extra support (office hours, email, online resource suggestions)

# Student Responsibilities

Whether in class or online, it’s up to you to practice what’s called self–regulated learning (SRL) if you want to get a good grade. That means you must be self-motivated, self-aware, and accountable to yourself by learning material throughout the week instead of waiting until the last minute for deadlines. Reach out to me if you have questions about the material and/or the course. I can't answer questions if I don't know what they are!

## Expectations & General Advice

* **Do’s:** If you experience technical difficulties uploading assignments, contact me immediately. If you experience personal difficulties, communicate with me sooner rather than later so we can discuss possible accommodations.
* **Don’ts:** Don’t wait to reach out to me if you’re having trouble with the material. If you don’t pass a quiz, don’t immediately use another attempt. Take time to review what you missed, study your notes and/or discuss it with me. In my experience, students who “shot gun” taking quizzes back-to-back don’t do well in the course.

## Netiquette

Netiquette refers to basic behavior, including common courtesy and informal “rules,” we follow in cyberspace. For this course, you are expected to do the following:

* All files must include at least your last name, the course section, and a short description:

“placencia\_ie2250\_lab1\_supporting\_work.docx”

* Tone: Be aware of your tone. Avoid sentences typed in all caps as it implies “screaming” or “shouting.” Avoid angry messages, flaming, and trolling. Do not use offensive or profane language.
* Discussions: Be sensitive to those with different cultural and/or linguistic backgrounds, including different political and religious beliefs. Respect different views and opinions. Provide constructive feedback and use good judgment composing responses to your classmates.
* Remember slang can be misunderstood or misinterpreted, so use “academic” voice. pls dnt use txt lang when sending messages 2 me.
* Be professional and use good grammar and spelling. Consider using a text editor to check spelling and grammar before posting something online.

# Grades

This course uses *standards-based grading*. In this system, course grades are determined by demonstrating mastery of the standards listed below, instead of by how many points you get on each assignment. The main features of this system are:

* **You earn your own grade.** Requirements for each letter grade are in the table below. From the very start of class, you know exactly how much work you need to do to earn the grade you want. If you do that work, you get that grade. There’s no uncertainty!
* **Pass/No Pass.** You receive a “Pass” by demonstrating mastery on each standard.

Your course grade is determined by the quantity and quality of evidence you provide to demonstrate your mastery in two areas:

* Mastery of basic (fundamental) course knowledge measured by problems for each standard on quizzes, labs, and the comprehensive exam.
* Learning process measured by weekly portfolio updates

Letter grades will be assigned using the following table. Note, you must complete *ALL* bullet points for a grade to receive that grade. Plus/minus grades will be assigned if you are between two categories based on check-in quality.

| **To earn this grade:** | **Do all of the following: (Subject to Revision)** |
| --- | --- |
| A | * 90% or better on **all** Labs & Lab Quizzes (Not on average) * 90% or better on Final Project * 90% or better for all portfolio scores * 85% or better on Comprehensive Exam * Peer Evaluation scores better than 4 |
| B | * 80% or better on **all** Labs & Lab Quizzes (Not on average) * 80% or better on Final Project * 80% or better for all portfolio scores * 75% or better on Comprehensive Exam * Peer Evaluation scores better than 3 |
| C | * 70% or better on **all** Labs & Lab Quizzes (Not on average) * 70% or better on Final Project * 70% or better for all portfolio scores * 65% or better on Comprehensive Exam * Peer Evaluation scores better than 2 |
| D | * Meet only three requirements for a C |
| F | * Does not meet at least three requirements for a C |

## Standards

Standards will be assessed via labs, quizzes, portfolios, and a comprehensive exam.

### Labs and Lab Quizzes (Due dates posted on Canvas calendar)

Labs will be graded on both individual (50%) and group effort (50%):

Group work will be graded on: 1) did the students do the lab work, and 2) did they get the expected results. If you do not participate in a lab you will receive a 0 for that lab grade based on peer feedback.

Individual work will be online quizzes based on lecture and lab material.

Labs and quizzes are due one week after we complete a topic. For each quiz, you must submit a file showing how you derived your solutions to receive full credit. I give partial credit based on correct processes I see in these files.

If you do not pass a lab or quiz on your first attempt you have **one week** to review, revise, and resubmit solutions to Canvas without penalty. Revision should **clearly** show the original answer and how you found the correct solution. Any additional attempt or time will cost one token.

### Data Entry Deadline

Several labs throughout the semester require student to enter their data.

Students must enter their data within one day of the lab or their grade for that lab will be reduced by one full grade each day.

## Comprehensive Exam

The exam will be cumulative, open book, and open notes. You will have one attempt only.

## Portfolio

Each student will create a portfolio based on course material. Each section of the portfolio can be used to create a final comprehensive team project.

## Team Project

To assess the level of learning during the course, you and your team will have a comprehensive project paper that will synthesize everything you learn in class based on your portfolio. Teams may submit one early draft for feedback and a preliminary grade. This must be submitted no later than two weeks before the final deadline. Teams may either accept the preliminary grade or revise and submit their project by the final deadline. You must submit a paper and a 5-minute summary presentation. Please see the Canvas module online for Team Project Guidelines including grading rubric and paper style sheet.

Grades for the team project will depend both on how well the project fulfills rubric standards and individual contribution which will be assessed by peer reviews.

# Make-Up and Late Work Policies

**No make-up or late work will be accepted.** However, students have the option to use tokens at their discretion to “buy a pass”.

Each person **starts with 1 token per semester.**

Tokens can be used to:

* Complete a missed assignment.
* Submit a late assignment.
* Revise a submission after the 1 week revision period.

**Spending Tokens:**

* 1 token per request
* 2 tokens **per week**

You cannot save all of the tokens to use at once, so plan accordingly.

**Earning tokens:**

* Complete extra credit related to an assignment.
* You can earn up to 9 tokens per semester.

# Academic Integrity

I expect students to conduct themselves with academic integrity at all times, based on the [Student Conduct Code](https://www.cpp.edu/studentconduct/student-conduct-code.shtml) and [academic policies](https://catalog.cpp.edu/content.php?catoid=9&navoid=1153) found in the University Catalog. Violations of academic integrity include, but are not limited to:

* Submitting work that is not your own (e.g., solutions copied from the internet, a classmate, or friend)
* Posting problems from this class (HW, quizzes, and exams) anywhere online – even if you do not use the resulting answers (or no one posts answers)
* Using online tools during quizzes and tests that are not permitted
* Discussing quizzes and tests with other students before Dr. Placencia says it’s ok to do so.

**Cheating:**

* I suspect most students cheat when they feel scared for various reasons. It is *normal* to struggle in this class. You will always have opportunities to improve your grade. Don’t let fear make bad decisions for you!
* It isn’t fair to your classmates.
* It makes it more difficult for you to realize how *smart and capable you really are*.
* The risks are not worth the rewards. If you cheat in school now, most likely you will cheat later when the stakes and consequences are much higher.
* Generally speaking, you should feel confident and proud to say that the work you do in this class is your own.

If I have questions or concerns about any of your work, I reserve the right to require a Zoom meeting with you prior to assigning a grade.

# Privacy and Security

Remote learning environments make privacy and security a big concern. Your work will be submitted and stored through secure online servers (Canvas and MS Office 356). Any video recordings from class sessions will be posted through the CPP streaming service to protect your privacy. It is expected that you will likewise honor the integrity of my materials and not post them to any website (Reddit, Chegg, etc.).

Discord is not officially allowed by the university, do be careful not to post any sensitive material on that course server. It will only be used for quick communication.

If you have any other question about enterprise software or any discipline-specific software at Cal Poly Pomona please consult the following:

* [Online privacy notice](https://www.cpp.edu/privacy.shtml)
* [University Library privacy policy](https://www.cpp.edu/library/about/about-the-library/privacy-policy.shtml)]

# University Student Support

A list of [many campus resources](http://www.cpp.edu/campus-life/student-services/) to help you succeed.

* [Broncos Care Basic Needs](https://www.cpp.edu/basicneeds/) for students experiencing food or housing insecurity
* [Dean of Students](https://www.cpp.edu/deanofstudents/departments.shtml), which includes the Cultural Centers, the Dreamers Resource Center, the Women’s Resource Center, clubs, etc.
* [IT Resources](https://www.cpp.edu/it/students/) for students
* [Learning Resource Center](https://www.cpp.edu/lrc/) for tutoring in many courses
* [Library Resource Guides](https://libguides.library.cpp.edu/)
* [LinkedIn Learning](https://cpp.service-now.com/kb_view.do?sysparm_article=KB0001099), a very broad educational platform that students have access to via their Bronco credentials
* [Student Health and Wellbeing](https://www.cpp.edu/healthwellbeing/) – this website leads you to many student services including [Counseling](https://www.cpp.edu/caps/), the [Disability Resource Center](https://www.cpp.edu/drc/), [Health Services](https://www.cpp.edu/health/student-health-services.shtml), the [Integrated Care Network](https://www.cpp.edu/healthwellbeing/icn.shtml), [Survivor Advocacy Services](https://www.cpp.edu/survivoradvocacy/), and the [Bronco Wellness Center](https://www.cpp.edu/health/bronco-wellness-services.shtml)
* [Student Success Central](https://www.cpp.edu/studentsuccess/) – this website leads you to many resources including those related to COVID19.
* [Veterans Resource Center](https://www.cpp.edu/veterans/)]

# Course Schedule

| **Wk** | **Topic(s)** | **Reading/Prep** | **Graded Assessment** |
| --- | --- | --- | --- |
| 1 | Introduction  Institutional Review Boards (IRB) | Module 1 | Lab 1 |
| 2 | Developing a Data Pipeline | Module 2 |  |
| 3 | Measuring User System Performance | Module 3 |  |
| 4 | Data Narration and Visualization | Module 4 | Lab 2 |
| 5 | Errors | Module 5 | Lab 3 |
| 6 | System Modeling | Module 4 |  |
| Hierarchical Task Analysis (HTA) | Module 4 |  |
| 7 | Ability Based Design, Ergonomics, and Anthropometrics | Module 5 |  |
| Anthropometry | Module 5 |  |
| 8 | Sensory Perception | Module 6 |  |
| Vision & Hearing | Module 6 |  |
| 9 | Sensory Perception | Module 7 |  |
| Touch | Module 7 |  |
| 10 | Predictive Analysis | Module 8 |  |
| Lifting: NIOSH and Snook | Module 8 |  |
| 11 | Predictive Analysis | Module 9 |  |
| Tools | Module 9 |  |
| 12 | Automation | Module 10 |  |
| Automation | Module 10 |  |
| 13 | Automation | Module 11 |  |
| Automation | Module 10 |  |
| 14 | Guest Lecture |  |  |
| Review |  |
| Final Project Deadline |  |
| 15 | Comprehensive Exam | All Modules |  |

1. Sehgal, K. “How to Write Email with Military Precision,” *Harvard Business Review*, Nov 22, 2016, <https://hbr.org/2016/11/how-to-write-email-with-military-precision>, accessed August 21, 2018 [↑](#footnote-ref-1)