**­­­­­Human Factors and Ergonomics**

**EIN 3241**

***Class Periods:****Monday, Period 3, 9:35 AM -10:25 AM* (Morning)

***Class Periods:****Wednesday, Period 3, 9:35 AM -10:25 AM* (Morning)

***Class Periods:****Friday, Period 3, 9:35 AM -10:25 AM* (Morning)

***Location:***WEIL 0238 (Morning)

***Academic Term:*** *Spring 2023*

***Instructor:*** Sanaz Motamedi, Ph.D. Industrial and Systems Engineering

***Email Address:*** [smotamedi@ufl.edu](mailto:smotamedi@ufl.edu)

***Office Hours:*** Mondays 5:30PM-6:30PM and Fridays 5:30PM-6:30PM

***Office Location:*** Online

**TA:** Walter Gabriel Sanchez

***Email Address:*** walter.sanchez@ufl.edu

***Office Hours:*** Wednesdays 5:30-6:30PM

***Office Location:*** Online

**TA:** Hailee Riann Cono

***Email Address:*** haileecono@ufl.edu

***Office Hours:*** NA

***Office Location:*** Online

***Course Description***

Introduces the techniques and concepts necessary to understand users and workplace requirements as they apply to the design of sociotechnical systems. The topics covered include methods to measure and understand work (work measurement), human cognitive and physical capabilities and limitations, and workplace requirements. Applications to design, including computer displays, noise, hand-eye coordination, as well as repetitive and high physical effort tasks will be presented.

***Course Pre-Requisites / Co-Requisites***

Statics (EGM2511)

***Course Objectives***

At the conclusion of this course, students will be able to:

* Describe the meaning and importance of human factors and ergonomics
* Relate human sensory, cognitive, and physical capabilities and limitations to the design of human-machine systems
* Select and correctly use appropriate work measurement, human-machine system analysis, and design tools
* Apply human-machine system design principles to real-world problems through exercises

***Materials and Supply Fees***

None

***Required Textbooks***

* Lee, J.D., Wickens, C. D., Liu, Y. D. & Boyle, L.N. (2017). Designing for People: An Introduction to Human Factors Engineering (3rd Ed.) ISBN: 978-1539808008 (Required).
* Note: You may share with a peer or classmate.

***Online Resources***

Most of the material for this class will be available on E-learning. It is therefore crucial that you know how to efficiently use E-learning. *In particular, the course is classified in multiple modules in which you can find lecture notes, assignments, and supplemental materials*.

In addition to that, there are 5 categories in this folder. Most of them are self-explanatory.

**1.** **Project**: Contains any documents related to project.

**2.** **General Info**: Contains the syllabus for this class or any other documents regarding the course.

**3.** **Case studies:** Contains any documents related to case studies.

**4.** **Assignment**: Contains the statements/solutions to the homework assignments.

**5.** **Exam**: Contains information relative to the exams. This includes the rules that will be enforced during the exams as well as the material that will be tested.

**6. Lecture:** Contains all lecture notes.

There are also three tools that you will find handy to use.

1. **Announcements**: Will contain time-sensitive important reminders or clarifications about the class. This is student responsibility to make sure read the announcement actively.
2. **Mail**: Allows you to send e-mail to the instructor/TA and/or to other students of the class. It is very easy to use, and it is the preferred way to communicate with the instructor/TA.
3. **Grades**: Contains the grades you obtained for the class so far. If you observe a discrepancy between the grade you got on paper and the grade given in E-learning, you should directly contact the TA. Also contact the TA if you have no grade on E-learning for an assignment that was returned to you.
4. **Zoom:** Instructor and TA will have online class for *some of the classes* to interact with students. The link of zoom meeting will be available in Canvas.

***Class Communication Policy***

All communications relative to the course will be made on E-learning. When possible, these announcements will be reiterated in class. **Students are therefore responsible to check E-learning regularly for possible updates.**

If you have a question use of the following ways to communicate it:

**Discussion board:** There is a good chance other people in the class have the same question or, at least, will benefit from the answer. Please post all questions related to course content on E-Learning using the questions discussion board so that everyone in the course can benefit from your questions and the replies. Questions posted to question discussion board will be answered within two (2) business days.

**During class meetings**: The best moment to ask a question about something you do not understand is probably during the class meetings. If you experience a problem, it is likely that other students experience the same problem too.

**Office hours**: The instructor and TAs will have office hours throughout the week online. You can stop by anytime during these hours. Finally, when you come to office hours or to an appointment, you should come prepared. You should have a list of specific problems you would like the instructor or the TA to answer. Be ready to ask your questions instead of trying to locate them in the book or lecture note. You should never approach a TA with “I do not understand anything”. Make sure to find out first what you do not understand before you come to see the instructor or the TAs.

**E-mail**: Very often, the questions you have are brief and do not require very long answers. If this is the case, you can send your questions by E-mail (**copy both instructor and TA**), clearly mentioning in the header that it is a question regarding EIN 4360C.

**Appointments**: If it is not possible for you to come to office hours, you can schedule an appointment with the instructor or the TAs. These appointments have to be arranged by E-mail (**copy both instructor and TAs**). Include in your E-mail a list of time slots throughout the week that are convenient for you. The more flexible the time slots you give, the quicker you will receive help. If you do not have a preference for who will help you, I suggest you send a single request E-mail to both instructor and TA. Please be aware that we will not make an appointment outside of regular workdays/hours.

***Professional Component (ABET):***

This course contributes to ensuring that the following program educational objectives of our BSISE program are met:

Within 5 years of graduation, BSISE graduates…

* Are successful professionals using industrial and systems engineering skills;
* Acquire advanced knowledge through continuing education or advanced degree programs;
* Are active leaders in their profession and/or community.

***Relation to Program Outcomes (ABET):***

|  |  |
| --- | --- |
| **Outcome** | **Coverage\*** |
| 1. Identify, formulate, and solve engineering problems | High |
| 2. Apply engineering design … consideration of public health, safety, and welfare as well as global, cultural, social, environmental, and economic factors | Medium |
| 3. Communicate effectively with a range of audiences |  |
| 4. Recognize ethical and professional responsibilities … impact of engineering solutions in global, economic, environmental, and societal contexts | Medium |
| 5. Function effectively on a team … provide leadership, create a collaborative and inclusive environment … | Low |
| 6. Develop and conduct appropriate experimentation, analyze, and interpret data … |  |
| 7. Ability to acquire and apply new knowledge as needed … |  |

***Course Schedule (Tentative)***

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Date** | **Topic** | **Modules** |
| 1 | Monday, Jan 9th | Course Logistics and Introduction Survey | 1 |
| Wednesday, Jan 11th | Introduction to Human Factors and Ergonomics and User Centered Design |
| Friday, Jan 13th | Introduction to Human Factors and Ergonomics and User Centered Design |
| 2 | Monday, Jan 16th | **Holiday** |
| Wednesday, Jan 18th | Work Measurement: Work sampling | 2-A |
| Friday, Jan 20th | Work Measurement: Work sampling |
| 3 | Monday,Jan 23rd | Work Measurement: Work sampling,  Case Study 1: Physical Ergonomics  **(Quiz 1 covers module 1)** |
| Wednesday, Jan 25th | Work Measurement**:** Time study methods |
| Friday, Jan 27th | Work Measurement: Time study methods | 2-B |
| 4 | Monday, Jan 30th | Work Measurement: Time study methods **(Quiz 2 covers module 2: Part A and B)** |
| Wednesday, Feb 1st | Work Measurement: **Time study methods** **lab** **(Lab 1)** |
| Friday, Feb 3rd | Work Measurement: Pre-determined time systems | 2-C |
| 5 | Monday, Feb 6th | Work Measurement: Pre-determined time systems **(Quiz 3 covers module 2: Part C)** |
| Wednesday, Feb 8th | Work Measurement: Pre-determined time systems lab **(Lab 2)** |
| Friday, Feb 10th | Case Study 2: Physical Ergonomics  Project updates 1 |
| 6 | Monday, Feb 13th | Design Methods | 3-A |
| Wednesday, Feb 15th | Design Methods |
| Friday, Feb 17th | Design Methods lab, **Project updates 1** |
| 7 | Monday, Feb 20th | Evaluation Methods and Research Methods | 3-B |
| Wednesday, Feb 22nd | Evaluation Methods and Research Methods |
| Friday, Feb 24th | Evaluation Methods and Research Methods,  Case Study 3: Physical Ergonomics |
| 8 | Monday**,** Feb 27th | Cognitive Ergonomics: Visual Sensory System, **(Quiz 4 covers module 3)** | 4-A |
| Wednesday, March 1st | **Exam 1 Logistics**,  Case Study 4: Physical Ergonomics |
| Friday, March 3rd | **Exam 1 Review** |
| 9 | Monday, March 6th | Cognitive Ergonomics: Visual Sensory System |
| Wednesday, March 8th | Cognitive Ergonomics: Visual Sensory System lab **(Lab 3)** | 1🡪4-A |
| Friday, March 10th | **Exam 1 (2-hour night exam)** |
| 10 | Monday, March 13th | Spring Break |  |
| Wednesday, March 15th | Spring Break |
| Friday, March 17th | Spring Break |
| 11 | Monday, March 20th | Exam 1 reflectionandCase Study 5: Internal and External Environmental Factors | 4-B |
| Wednesday, March 22nd | Cognitive Ergonomics: Audible Sensory System |
| Friday, March 24th | Cognitive Ergonomics: Audible Sensory System |
| 12 | Monday, March 27th | Cognitive Ergonomics: Decision Making, **(Quiz 5 covers modules 4-A and 4-B)** | 4-C |
| Wednesday, March 29th | Cognitive Ergonomics: Audible Sensory System Lab **(Lab 4)** |
| Friday, March 31st | Project updates 2**,** Case Study 6: Internal and External Environmental Factors |
| 13 | Monday, April 3rd | Cognitive Ergonomics: Decision Making |
| Wednesday, April 5th | Cognitive Ergonomics: Display and Control Principles | 5 |
| Friday, April 7th | **Exam 2 Logistics**, Case Study 7: Internal and External Environmental Factors |
| 14 | Monday, April 10th | **Exam 2 Review** |
| Wednesday, April 12nd | Cognitive Ergonomics: Display and Control Principles, **(Quiz 6 covers modules 4-C and 5)** |
| Friday, April 14th | Cognitive Ergonomics: Display and Control Principles Lab **(Lab 5)** | 6 |
| 15 | Monday, April 17th | Introduction to workplace requirements | 4-B🡪6 |
| Wednesday, April 19th | **Exam 2 (2-hour night exam)** |  |
| Friday, April 21th | Final Presentation |  |
| 16 | Monday, April 24th | Final Presentation |  |
| Wednesday, April 26th | Final Presentation |  |

***Evaluation of Grades***

|  |  |
| --- | --- |
| **Name** | **Technical Grade %** |
| Quizzes | 10 |
| Labs | 20 |
| Exams | 40 |
|  |  |
| Projects | 20 |
| Case Studies | 10 |

***Grading Policy***

Term exam dates will be announced well in advance. Missing an exam without substantial **PRIOR** notification will result in a zero grade for that exam. Final Grades will be based on classroom participation, exams, projects, and homework assignments and it will be rounded off to the nearest integer, and assigned on the standard scale as follows:

|  |  |
| --- | --- |
| **Percent** | **Grade** |
| 93 - 100 | A |
| 90 - 92 | A- |
| 87 - 89 | B+ |
| 83 - 86 | B |
| 80 - 82 | B- |
| 77 - 79 | C+ |
| 73 - 76 | C |
| 70 - 72 | C- |
| 67 - 69 | D+ |
| 63 - 66 | D |
| 60 - 62 | D- |
| 0 - 59 | E |

More information on UF grading policy may be found at:   
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

***E-Learning/Canvas***

Major announcements and important documents, such as homework assignments, and project handouts will be posted on Canvas. In addition, exams, homework, projects, and assignments will need to be submitted online. If you submit a scan or photo of handwritten work, *it is your responsibility to ensure that the submitted document is legible, otherwise it will not be graded.* Please follow any digital submission guidelines that are provided.

***E-mail Communications***

You are required to use your UF email address for the purposes of this class. The instructor will not be responsible for: 1) Emails that do not reach you because you do not check or use your UF address; or 2) Emails that I do not receive because they are filtered into junk mail because they do not come from your UF address; or 3) Emails that you do not receive to your UF account because your mailbox is full.

***Attendance Policy and Class Expectations***

Attendance is not required; however, it is strongly recommended. It will be to your benefit to attend all lectures. Students will be responsible for **all** material covered in class. There are several in-class assignments.

Lectures are there to facilitate efficient learning. You should be focused on the course material and the in-class exercises assigned, not on activities that do not contribute to you and your classmates’ understanding of the course work. Those who behave inappropriately will be asked to leave. If you cannot follow the lecture anymore, you can leave the class quietly; I will not be offended. Please, remember to turn your digital devices to silent when you enter the classroom.

***Exam and Make-Up Policy***

To assess student learning, students will be given three Exams. Although a tentative schedule is given, the date of exams will be finalized one week in advance. Make-up tests will be given for unanticipated absences ONLY (e.g., illness with a doctor’s report, death in family, but **NOT** for Employment interviews, employer events, weddings, vacations, etc). Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation. If you missed an exam due to a health problem, you will need to provide documentation that indicates the date of the visit. A note indicating that you were seen at the health center the day of the exam is not sufficient documentation of a medically excused absence from an exam. The note must say that you were medically unable to take the exam.

In case of an exam conflict, you will need to present evidence of the conflict to the instructor ONE week prior to exam.

In-class assignments can only be made-up if the excuse is consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>). Instructor may request appropriate documentation.

***Regrading Policy***

Requests for regrading of exams will be considered only with a written explanation and only within a one-week period from the time graded work is returned in class. Specifically, you need to writ an email and explain what specifically you want regraded and why you believe the original grade was incorrect. Instructor will get back to you with in a week. Grades will be posted on the course page on Canvas.

***Administrative Issues***

* Class will begin promptly. Please let the instructor know in advance if you have a planned absence from class.
* While in class, please silence your digital devices and turn off all music listening devices.
* All exams are allowed (1) 8.5 x 11 inch. study sheet. Use of unauthorized aids on exams will result in a grade of zero; additional penalties may follow.
* I reserve the right to amend this syllabus as needed.

***Students Requiring Accommodations***

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

• Your academic advisor or Graduate Program Coordinator

• Robin Bielling, Director of Human Resources, 352-392-0903, [rbielling@eng.ufl.edu](mailto:rbielling@eng.ufl.edu)

• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)

• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

***Software Use***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

***Campus Resources:***

*Health and Wellness*

**U Matter, We Care:**

Your well-being is important to the University of Florida.  The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need.  If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress.  A nighttime and weekend crisis counselor is available by phone at 352-392-1575.  The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center.  Please remember that asking for help is a sign of strength.  In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

**Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [**Office of Title IX Compliance**](https://titleix.ufl.edu/), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

**Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department**at392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

*Academic Resources*

**E-learning technical suppor***t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.

**Writing Studio, 302 Tigert Hall***,* 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus***:* [https://care.dso.ufl.edu](https://care.dso.ufl.edu/).

**On-Line Students Complaints***:* <http://www.distance.ufl.edu/student-complaint-process>.