**Course Number:** ID 6109

**Course Title:** Human Factors and Ergonomics

**Credit Value:** 3 credit hours

**Course Times:**

**Instructor:**

**Email/Office Hours:**

***\*Graduate level requirements added***

*This course was developed from ID2320. New readings, assignments and a new graduate level exam have been added.*

**General Information**

**Course Description:**

This course will cover an introduction to the topics of Human Factors and Ergonomics and their practical application in the design of workplace products, consumer products and services. Students will learn how to apply ergonomic principles in different contexts for the reduction of stress and strain on a person’s body, for the analysis of hazards, for the design of lifting and stressful tasks, and for the design of human computer/product interfaces.

## Pre-Requisites

None

**Course Goals and Learning Outcomes:**

Upon completion of the course students demonstrate knowledge, skill and abilities in the following areas:

* Understand the basics of human physical capabilities, senses and cognition
* Evaluate the design ergonomics of products and systems
* Apply ergonomic design principles to products, interfaces and services
* Apply ergonomic research to the design process

**Weekly Learning Activities:**

* Lecture (3 hours)

**Course Requirements and Grading**

**Required Texts**

Psychology as a Biological Science.

Section 3: Vision

Section 3: Hearing

Section 3: Touch and Pain

Section 3: The Vestibular System

Salvendy, G. (2012). Handbook of Human Factors and Ergonomics. John Wiley & Sons Inc.

Ch 24: Illumination

Psychology as a Biological Science.

Section 5: Judgment and Decision Making

Meister, D. (2001) Human Factors in System Design, Development and Testing. CRC Press.

Ch 3: Design Methods

Sears, A, Jacko, J. eds (2012). The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications. CRC Press.

Ch 5: Cognitive Architecture

Ch 17: Visual Design Principles for Usable Interfaces

Salvendy, G. (2012). Handbook of Human Factors and Ergonomics. John Wiley & Sons Inc.

Ch 59: Automation

Bridger, R.S. (2008). Introduction to Ergonomics. CRC Press. Boca Raton.

Ch 13: Displays, controls and virtual environments

Dix, A., Finlay, J., Abowd, G., Beale, R. (2004). Human-Computer Interaction. Pearson Education Ltd.

Ch 7: Design Rules

MacLeod, Dan (2013). The Rules of Work: A Practical Engineering Guide to Ergonomics. CRC Press. Boca Raton.

Part I: The Rules

Review the principles in sections 1-10

Part II: Measurements and Guidelines

14. Anthropometry

15. Exertion and Biomechanics

16. Posture

17. Motions

18. Miscellaneous

19. NIOSH Lifting Guide

19. Pushing, Pulling and Carrying Guides

Salvendy, G. (2012). Handbook of Human Factors and Ergonomics. John Wiley & Sons Inc.

Ch 25: Occupational Health and Safety Management

Ch 38: Accident and Incident Investigation

Wickens, C. Hollands, J. Banbury, S., Parasuraman, R. (2015). Engineering Psychology and Human Performance. Psychology Press.

Ch 11 (last half): Attention, Time-Sharing and Workload

Ch 12: Stress and Human Error

## Course Website and Other Classroom Management Tools

Canvas (<http://canvas.gatech.edu/>) will be the main portal for dissemination of course information.

Students are expected to check in on a daily basis

**Grading**

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | | **%** | **Description** |
| 1 | In class assignments/quizzes | 25% | In class assignments and quizzes related to the weekly topic. |
| 2 | Take Home Assignments | 25% | Assignments completed outside of class related to one or more covered topics. |
| 3 | Final Project | 15% | End of semester assignment applying human factors to a design problem. |
| 4 | Exam 1 | 15% | Exam 1: *Will cover lecture and reading materials assigned prior to Sept 22nd* |
| 5 | Final Exam | 20% | Final Exam: *Will cover all lecture and reading materials assigned* |
|  | **Total** | **100%** |  |

**Grading Scale**

Your final grade will be assigned as a letter grade according to the following scale:

A 90-100% (Guide: Independent work style and exceeding expectations)

B 80-89% (Guide: Meet expectations)

C 70-79% (Guide: Meets the majority of expectations)

D 60-69% (Guide: Fails to meet some expectations

F 0-59% (Guide: Fails to meet most expectations)

**Course Schedule**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Date | Weekly Topic | Assignment/Deliverable |
| **1** | Aug  23, 25 | Introduction, History and  Research Methods | Readings and in class activities |
| **2** | Aug  30, Sep 1 | Design Evaluation Methods | Readings and in class activities  Assignment 1 |
| **3** | Sep  6, 8 | Vision |  |
| **4** | Sep  13, 15 | Auditory, Tactile, and Vestibular Systems  Cognition | Readings and in class activities  Assignment 2 |
| **5** | Sep  20, 22 | Decision Making  Displays | Readings and in class activities  Assignment 3 |
| **6** | Sep 27, 29 | Control Systems  Exam 1 Review | Readings and in class activities |
| **7** | Oct  4, 6 | Exam 1  Control Systems II | Exam 1 |
| **8** | Oct  11, 13 | Anthropometry  Body Measurement | Readings and in class activities  Assignment 4 |
| **9** | Oct  18, 20 | Biomechanics of Work | Readings and in class activities  Final Project |
| **10** | Oct  25, 27 | Human Computer Interaction | Readings and in class activities |
| **11** | Nov  1, 3 | Stress and Workload | Readings and in class activities  Assignment 5 |
| **12** | Nov  8, 10 | Safety | Readings and in class activities |
| **13** | Nov  15, 17 | Automation | Readings and in class activities |
| **14** | Nov  22, 24 | Evaluation | Readings and in class activities  Final Project due (Tues) |
| **15** | Nov29, Dec 1 | Final Project Presentations |  |
| **16** | Dec 6 | Final Exam |  |

**Course Expectations, Guidelines and Policies**

## Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or <http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

## Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

## Attendance and/or Participation

Students are required to be in class for designated times with all assigned work completed. Attendance will be recorded for each student for each class during the semester. Excessive missed classes will affect final course grades. A total of 3 unexcused absences are allowed before impacting a final grade. A fourth unexcused absence will result in the reduction of one letter grade from the final course grade. Each additional unexcused absence will result in the reduction of an additional letter grade. Excessive unexcused absences will result in failure of the course. Students are expected to be on time. Students arriving more than 5 minutes after the scheduled start of class will be recorded as late. 3 unexcused late arrivals will be counted equivalent to 1 unexcused absence. It is the student's responsibility to check in with an instructor or TA upon arrival to class to ensure proper recording of attendance. Failure to check in with an instructor or TA after attendance is called may result in being marked absent.

If you know that you will miss a class for a valid reason (such as for a major religious observance or participation in an approved Institute activity), please let me know at least 24 hours in advance. If an unexpected situation occurs, it is your responsibility to contact me *within* *24 hours* of the scheduled class time.

Tardiness or missed classes will be excused for valid reasons. Valid written documentation must be provided in order to excuse any instance of tardiness or absence. Documentation should be provided no later than the next class attended (it may be scanned and sent to instructor and TA before this). Valid documentation may include a note from the Office of the Dean of Students, a note from Stamps health center confirming a visit, a note from a doctor or clinic, etc. Any extenuating circumstances should be discussed with your instructor as soon as possible.

Students are expected to actively engage in any in-class discussions and activities.

## Collaboration and Group work

Typically, each member of a group receives the same mark unless a student is not contributing. Please inform the instructor immediately if a group member is not performing their assigned portion of the assignment. A lower grade or fail grade will be entered for a student not contributing to the group work.

## Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Students are expected to complete assigned readings and come prepared to each class. Due dates/times will be clearly stated on assignment descriptions. Late submission of work will NOT be accepted. Assigned work that is not turned in on time via the specified method will receive a grade of 0. For in class assignments this will generally require physically turning in a provided activity sheet at the end of class (note if taken home this will count as not turned in. They may not be turned in later). Outside of class assignments will generally be delivered electronically via Canvas. It is each student's responsibility to plan ahead to ensure that work is completed on time and turned in. This means that you should plan ahead for possible outages slow network performance. Check all work by re-downloading it to ensure that it is the actual file that you meant to turn in AND that it is not corrupted (such as being a 0 byte file). For assignments, it is the equal responsibility of all members to coordinate with each other to ensure everything is delivered on time.

## Student-Faculty Expectations Agreement

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek.

## Student Use of Mobile Devices in the Classroom

Students are expected to be considerate of others in their use of mobile phones and laptops within the classroom. Phones should be silenced at all times. Students should not text or check Facebook etc. during class time to avoid distracting others and to maximize learning.

## Additional Course Policies

Attendance and active participation is expected of all students in class, in-class discussions and all presentations of assigned work. Demonstration of independence, initiative, and time management is also expected.

**Campus Resources for Students**

We encourage making use of the range of laboratories, workshops and makers spaces around campus. In the School of ID we house the ID Shop (basement), Body Scan Lab, IPDL Lab and Driving Lab. Please contact workshop and lab staff to arrange working space and access to facilities. The Digital Fabrication Lab is a few minutes away.

**Student Academic Bill of Rights**

* The right to attend classes at regularly scheduled times without deviation from such time and without penalty if the student cannot attend instructional, lab, or examination hours not institutionally scheduled.
* The right to consult with an assigned and qualified advisor for a reasonable amount of time each term.
* The right to consult with faculty outside usual classroom time such as regularly scheduled office hours by appointment.
* The right to have reasonable access to campus facilities of which use is required to complete course assignments and/or objectives.
* The right to receive a syllabus for each course at the first class meeting. The syllabus should include an outline of the course objectives, criteria used in determining the course grade, and any other requirements. Students should be informed of any changes made to the syllabus with reasonable time to adjust to these changes.
* The right to have reasonable time to learn course material prior to the administration of an examination.
* The right of each student to receive access to any of his/her records kept by the institution.
* The right to have reasonable access to grading instruments and/or evaluation criteria and to have graded material returned in a timely fashion.
* The right to be informed of the grade appeals process.
* The right to have reasonable facilities in which to receive instruction and examinations.
* The right to be informed in each course of the definition of academic misconduct.

Last update: 01/08/2019