

**SYS 323 – Human-Machine Interaction – Fall, 2005**  
 Required for Systems and Information Engineering Majors  
 Prerequisite: SYS 201 and 3rd-year standing in Systems Engineering  
*Syllabus last updated August 28, 2005*

Introduces design considerations and evaluation techniques that promote productive interaction between people and computers/machines. Examines pertinent human physiology and psychology, the structure and operation of the computer, and methods for designing interfaces between the two. Covers interface design, usability testing, basic experimental design, and lifecycle design. Includes group projects.

**Class Times:** SECTION 1: Mon, Wed, 2:00 – 3:15 OLS 005  
 SECTION 2: Mon, Wed, 3:30 – 4:45 OLS 005

**Course Website:** [https://toolkit.itc.virginia.edu/2005\\_Fall\\_SYS323-2](https://toolkit.itc.virginia.edu/2005_Fall_SYS323-2)  
**UVA HCI Website:** [www.sys.virginia.edu/hci](http://www.sys.virginia.edu/hci)

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**Course Objectives:** To learn basic aspects of human factors in the design of information support systems. We will cover: 1) human performance issues (physiology, memory, learning, problem-solving, human error), 2) the user interface design process (task analysis, product concept, functional requirements, prototype, design, and testing.) Students will gain basic skills in the analysis and design of human-machine systems through in-class exercises and a course project. The course is also designed to help students practice different communication skills (interviewing, written analysis, and oral presentation).

What fundamental questions will this course help you answer?

What methods can I use to analyze a human/systems interaction? What are the human information processing fundamentals to understand for designing and evaluating human-systems interactions? What theories explain the kinds of errors people make? What causes human error? What are the different kinds of human error? What is the basic physiology of the eye and ear? How do I design and conduct an effective task analysis? How do I design and conduct an effective usability evaluation? What are the advantages and disadvantages of the different usability evaluation methods? What effects can different designs have on performance?

**Grading: See Toolkit Grade Book**

50% - Project: You will be asked to do a group course project of your own choosing. The project should be relevant to the topics covered in class. For those groups interested in implementing a database of some sort for the project, please take a look at the following UVa ITC website. The ITC offers hosting for MySQL databases. <http://www.itc.virginia.edu/desktop/web/mysql/home.html>. Also see <http://www.web.virginia.edu/help/> if you plan to set up a web-based database system.

The ITC website (<http://www.itc.virginia.edu/desktop/web/mysql/home.html>) has most of the documentation needed to setup and run everything. Besides that source, other useful support can be found at [www.php.net](http://www.php.net).

A few other points about the ITC MySQL database:

- 1) To connect to the database, the name of the database is dbm1.itc.virginia.edu. When connecting via php, the username and password needed to connect to the database are the same username and password created to access MySQL from the web.
- 2) The only other point to note is that the database is MySQL, rather than postgresQL, which is what you used last year. Most of the commands are very similar. Any other, unknown commands were found via simple Google searches.

40% - Assignments: These are due on the date specified in the syllabus. No late assignments will be accepted.

10% - Participation: This is based on attendance, and your individual contributions to the final project, as judged by your peers within your group at the end of the semester. You will also be asked to log your own activities on the project.

The Honor System will be upheld in this class!!

Required Readings:

- 1) Christopher D. Wickens, John Lee, Yili D. Liu, Sallie Gordon-Becker (2003). An Introduction to Human Factors Engineering, 2<sup>nd</sup> Edition. Prentice Hall.
- 2) Course Notes and other readings distributed over the Instructional Toolkit

TENTATIVE CLASS SCHEDULE

<u>**</u>	<u>Date</u>	<u>Activity</u>	<u>Readings (due by class time of date listed)</u>	<u>Assignments (due 11:59pm of date listed)</u>
All	We. Aug 24	Course Introduction. Introduce course project		- Browse course website - Join the UVA student chapter of HFES
SG	Mo. Aug 29	In-class exercise and discussion: The Design Process	Ch. 1 and Ch. 3 (pp. 30-50) Project Assignment Sheet	- Sit where you want to sit for the rest of the semester. - Get into groups for the final project
SG	We. Aug 31	Graphic Design Principles (Layering, Chunking, Salience CRAP)	Finish, Ch. 3 (Design and	<b>Assignment 1:</b> Task Analysis of Course

			Evaluation Methods	Registration
All	Mo. Sep 5	<b>Group project teams present project concept to class 2-5 minutes max!</b>	Ch. 15 (HCI)	<b>Initial Group Presentation/ Report Log # 1</b>
GG	We. Sep 7	Lecture: Human Visual System Overview and Capabilities		<b>Assignment 2:</b> Redesign of 4 advertisements
All	Mo. Sep 12	Assignment 3 Presentations		<b>Assignment 3:</b> Present an evaluation of a poorly designed product
All	We. Sep 14	Assignment 3 Presentations		<b>Assignment 3:</b> Present an evaluation of a poorly designed product
<b>GG</b>	Mo. Sep 19	Lecture: Vision cont'd and Signal Detection Theory	Ch. 4 (Visual System)	<b>Assignment 4:</b> JND for visual contrast sensitivity
<b>GG</b>	We. Sep 21	Lecture: Tracking, Fitts Law, Information Theory	Ch. 9 (Control) pp. 218 -230	<b>Group Project Market, User, and Requirements Document Log # 2</b>
<b>SG</b>	Mo. Sep 26	Lecture: Human Information Processing	Ch. 6 (Cognition)	
<b>SG</b>	We. Sep 28	Lecture: Human Error	Ch. 7 (Decision Making, Error)	<b>Assignment 5:</b> Design according to HF theory/law
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All	We. Oct 5	<b>Groups present (non-functioning) GUI designs</b>		<b>Log #3</b>
All	Mo. Oct 10	<b>Groups present (non-functioning) GUI designs</b>		
<b>GG</b>	We. Oct 12	Lecture: <b>Human Auditory, Proprioceptive, Kinesthesia Systems Overviews Human Haptic/Tactile Systems and Capabilities</b>	Ch. 5 (Auditory & Haptic System)	
SG	Mo. Oct 17	Usability Testing & Experimental Design	Course Notes posted on Toolkit in Materials Section	
SG	We. Oct 19	Displays Workspace Management – Cockpit Control Language example, MPC Elucidator, FPT	Ch. 8 (Supervisory Control Displays)	<b>First Usability Test Plan – You must read Course Notes published on Toolkit</b>
SG	Mo. Oct 24		Ch. 16 (Automation)	
SG	We. Oct 26		Ch. 14 (Safety and Accident Prevention)	
All	Mo. Oct 31	<b>In-class review of project designs</b>		<b>First Usability Test Report and Presentation</b>
All	We. Nov 2	<b>In-class review of project designs</b>		<b>Log # 4</b>
<b>GG</b>	Mo. Nov 7	Lecture: Introduction to Control	Ch. 9 (Control) pp. 231 -242	
<b>GG</b>	We. Nov 9	Control Theory examples		<b>Second Usability Test Plan</b>
GG	Mo. Nov 14	Lecture: <b>Computer Structure/Operation, Low-level Data Input/Output</b>	Browse- Ch. 10 (Anthropometry & Workspace Design)	<b>Assignment 6:</b> Control

GG	We. Nov 16	Lecture: Emerging Virtual Reality Interfaces and Concepts	Browse- Ch. 11 (Biomechanics)	<b>Second Usability Test Report Log # 5</b>
All	Mo. Nov. 28	<b>Final Group project presentations</b>		<b>Final Group presentations</b>
All	We. Nov. 30	<b>Final Group project presentations</b>		<b>Final Group presentations</b>
All	Mo. Dec. 5	<b>Final Group project presentations</b>		<b>Final Group presentations Log # 6</b>

\*\* SG = Stephanie Guerlain, GG = Greg Gerling, TA = Teaching Assistant(s), All = All 4 of us

## Assignment Descriptions

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SEE TOOLKIT