

# **INSTRUCTIONS FOR COMPLETION OF THE UAMS GRADUATE SCHOOL COURSE APPROVAL FORM**

1. Please save this PDF to your computer for editing.
2. The form has been designed with fields for your responses, and these are indicated in blue and gray shading. Please complete all fields. Use the "tab" key to move between fields. A 'beep' will sound if you attempt to enter a response that contains more characters than is permitted. **IF YOU NEED HELP IN ANY OF THE FIELDS, PRESS THE F1 KEY AND A HELP WINDOW WILL OPEN.**
3. Print the document, and then obtain the appropriate signatures before submitting the form to the Graduate Office.

**COURSE APPROVAL FORM, Graduate School  
University of Arkansas for Medical Sciences**

This form and attached materials are due in the Graduate School Office on the first Monday of the month. All forms will be submitted to the UAMS Graduate Council Curriculum Committee for review and approval prior to consideration by the Graduate Council.

This form is not required for minor stylistic or editorial corrections to the title or course descriptions. These may be made when revising the catalog copy.

1. **Program:** Department of Biomedical Informatics

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*Department* *Alpha (Department) Code*

2. **Action proposed** (indicate one or more items): Effective term: Fall 2017

- |                                                                  |                                                                    |       |
|------------------------------------------------------------------|--------------------------------------------------------------------|-------|
| <input checked="" type="checkbox"/> Add course                   | <input type="checkbox"/> Change title                              |       |
| <input type="checkbox"/> Eliminate course<br>(No outline needed) | <input type="checkbox"/> Change credit hours from: _____ to _____  |       |
|                                                                  | <input type="checkbox"/> Change course number from: _____ to _____ |       |
|                                                                  | _____ Change description                                           | _____ |

3. **Course ID, title and description:**

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\_\_\_\_\_ Human Computer Interact  
*prefix* *number* *title (20 characters)*

Introduction to Human Computer Interaction  
*catalog name (40 characters)*

Scheduled offering:  Fall  Spring  Summer  On demand

To cross list a course, use the Course Cross Listing Form.

Describe the course in sentence form using 50 words or less as it is to appear in the catalog. List prerequisites, co-requisites and possible off-site instructional opportunities or requirements.

This graduate course is a survey course covering select topics from cognitive science, human factors, human centered design, and usability relevant to biomedical informatics.

4. **Justification:**

Justify this change in terms of course needs or curriculum improvement. State the effect of this change on any degree programs. Identify the courses to be eliminated, if any, if this course is approved. (Course Approval Forms must also be submitted for these courses) Identify any existing course or courses that would extensively overlap or be duplicated if the proposed curricular change occurs. Provide statements of concurrence with the change from the chairperson(s) and dean(s) of the programs/areas offering the affected courses.

There will be no change to degree programs.

## SYLLABUS

**COURSE NUMBER:** BIOM \_\_\_\_\_

**COURSE TITLE:** Introduction to Human Computer Interaction

**COURSE DESCRIPTION:**

This graduate course is a survey course covering select topics from cognitive science, human factors, human centered design, and usability relevant to biomedical informatics.

**PRE-REQUISITES:** Introduction to Biomedical Informatics

**GENERAL INFORMATION:**

**CREDITS:** 3 credit hours

**SEMESTER:** Fall, Spring

**LOCATION:** Campus and Online (hybrid)

**FACULTY:** Meredith Zozus

**SPECIAL ASSISTANCE:** Students who believe they may need accommodations in this class based on mental or physical impairments must contact the Students with a disability that need accommodations should contact the Associate Dean for Academic Affairs at (501) 686-5730 to schedule an appointment to discuss your needs. Please make arrangements as soon as possible so accommodations can be made in a timely manner.

**COURSE OBJECTIVES:**

Upon successful completion of this course, the student is able to:

1. Describe major theories from cognitive science that play a significant role in Human Computer Interaction (HCI)
2. Explain how cognitive science principles covered here impact display of information for human use.
3. Compare and contrast limits of human and computer performance
4. Add an aspect of computer use into a given manual task in a way that augments human performance
5. Apply task analysis methods and predictive models to a proposed user interface design for a given task.

6. Outline a human centered design process for the design and development of a new order set for emergency room physicians.
7. Outline a process to evaluate HCI aspects of a new information system.

### MAJOR TOPICS:

- Skills Rules Knowledge hierarchy
- Attention and pre-attention
  - Drury's model of visual search and inspection
  - Feature integration theory
  - Gestalt principles
  - Global versus local processing
  - Emergent features
  - Stroop effect
  - Concurrent processing
  - Situational awareness
  - Cognitive tunneling
- Human Information Processor Model
- Primacy and recency effects
- Distributed working memory
- Recognition versus recall
- Representation effect
- Multi-channel representation
- Proximity compatibility principle
- Human limitations, e.g., human error, and cognitive load
- Tasks conducive to humans and computers
- Human Centered Design (HCD)
- Usability engineering
- Task analysis and modeling methods
- Predictive models of human performance
  - Keystroke Level Modeling (KLM),
  - Goals, Operators, Methods, and Selection (GOMS),
  - Fitt's law
  - Hick-Hyman law (Hick's law)
- Descriptive models of human computer interaction
  - Buxton's State transition Model of Graphical Input
  - Guiard's Model of Bimanual Skill
- HCI Usability evaluation methods
- Advanced mechanisms for HCI such as virtual reality, haptic feedback, brain connectivity

### ASSIGNMENTS:

Listed below for each week.

- Week 1: Introduction to Psychology and human performance  
*Assignment:* Quiz questions based on the chapter.  
*Reading:* Wicks and Hollands Chapter 1
- Week 2: Signal detection and absolute judgment  
*Assignment:* Quiz questions based on the chapter.  
*Reading:* Wicks and Hollands Chapter 2
- Week 3: Attention  
*Assignment:* Quiz questions based on the chapter.  
*Reading:* Wicks and Hollands Chapter 3
- Week 4: Spatial displays, cognition and manual control  
*Assignment:* Quiz questions based on the chapter.  
*Reading:* Wicks and Hollands Chapters 4 and 5
- Week 5: Language and communication  
*Assignment:* Quiz questions based on the chapter.  
*Reading:* Wicks and Hollands Chapter 6
- Week 6: Memory and training  
*Assignment:* Quiz questions based on the chapter.  
*Reading:* Wicks and Hollands Chapter 7
- Week 7: Mental workload and stress  
*Assignment:* Quiz questions based on the chapter.  
*Reading:* Wicks and Hollands Chapters 10 and 11
- Week 8: Automation and human performance  
*Assignment:* Quiz questions based on the chapter.  
*Reading:* Wicks and Hollands Chapter 12

- Week 9: Human Centered Design (HCD)  
*Assignment:* Quiz questions based on the reading.  
*Reading:* materials provided by professor
- Week 10: Usability engineering and discount usability engineering  
*Assignment:* Quiz questions based on the reading.  
*Reading:* materials provided by professor
- Week 11: Task analysis and modeling methods, workflow and data flow  
*Assignment:* Quiz questions based on the reading.  
*Reading:* materials provided by professor
- Week 12: Predictive models of human performance, Keystroke Level Modeling (KLM), Goals, Operators, Methods, and Selection (GOMS), Fitt's law, Hick's law  
*Assignment:* Quiz questions based on the reading.  
*Reading:* materials provided by professor
- Week 13: Data aggregation and reporting  
*Assignment:* Quiz questions based on the reading.  
*Reading:* materials provided by professor
- Week 14: HCI Usability evaluation methods – Heuristics and Inspections  
*Assignment:* Quiz questions based on the reading.  
*Reading:* materials provided by professor
- Week 15: HCI Usability evaluation methods – Performance testing and observing in the wild  
*Assignment:* Quiz questions based on the reading.  
*Reading:* materials provided by professor

**MAJOR PROJECT:** Each student will work with the professor to identify a course project that will focus on either usability engineering (design) or evaluation of an information intervention in biomedicine.

**TEXTBOOKS:**

Christopher D. Wickens and Justin G. Hollands Engineering Psychology and Human Performance. Routledge, New York NY, 2012.

Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven Jacobs, Niklas Elmqvist, Nicholas Diakopoulos, Designing the User Interface: Strategies for Effective Human-Computer Interaction (6th Edition) 2016.

**EVALUATION:**

This is a graded course. Grades will be assigned based on their course average according to the following scale: A (93-100), B (85-92), C(75-84), D(65-74), Fail (lower than 64).

The course average will be comprised of course assignments and the final exam.

Assignments.....	30%
Final exam.....	20%
Major project.....	50%

6. Program Approvals:

Fred Prior, PhD  
\_\_\_\_\_  
(Print or type) Chairperson, Academic Department or Area

Fred Prior 10/26/16  
\_\_\_\_\_  
(Signature) Chairperson, Academic Department or Area Date

[Signature] 11/17/2016  
\_\_\_\_\_  
College Dean (Dean McGhee for College of Medicine) Date

7. Graduate School Approvals

[Signature] 11/17/2016  
\_\_\_\_\_  
Chairperson, Graduate Council Date

[Signature] 11/17/2016  
\_\_\_\_\_  
Dean of the Graduate School Date