
**Department of Information Systems
University of Maryland, Baltimore County (UMBC)
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**HCC 742
Developing Interfaces for Rehabilitation
Fall 2015**

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Office hours: Tuesday 3.00 - 4.00 pm and by appointment
Lectures: Tuesday 4.30-7.00 pm (ITE Building, Room 467)

Description: This 3 credit graduate level course offers a unique opportunity to learn about the challenges faced by individuals with long-term cognitive and motor impairments, with a view to designing mobile gaming applications for purposes of rehabilitation. Topics that will be covered include design for users with cognitive and motor impairments and mobile evaluation approaches. Learning outcomes will be assessed through an individual paper, the group-based development of a simple rehabilitation game, and a paper which presents a more detailed description of the research conducted. Students will also give an oral presentation summarizing their activities. The course aims to produce practitioners who are knowledgeable about the design process to address the needs of a diverse society.

Pre-requisites: Some knowledge of object-oriented programming required.

Additional information: HCC742 can be taken as a stand-alone, or can be taken after HCC 741.

Objectives:

- Understand the challenges faced by individuals with cognitive and motor impairments, and solutions designed to aid them with their tasks.
- Define and discuss related issues such as authorizing legislation, information sources, service delivery concerns, consumer empowerment, and ethics.
- Appreciate the broad range of specific technologies in the field of rehabilitation and assistive technology.
- Demonstrate an understanding of a functional approach to the assessment of rehabilitation and assistive technology needs.
- Apply design concepts to interfaces for rehabilitation.

Online Resources: A site relating to the course will be maintained on Blackboard. It can be accessed through myUMBC or at <http://blackboard.umbc.edu>. The site contains lecture slides, details of assignments, and announcements pertinent to the course. It will be updated throughout the semester. **Each student is responsible for checking the web page regularly, and for being aware of any information posted there.**

Reading Materials: This class requires students to read from a variety of books. Chapters which have been selected to supplement lectures are available in downloadable format from Blackboard. The books themselves are on reserve, available from the Issue Desk at the UMBC library:

- Cooper, R.A., Ohnabe, H, and Hobson, D.A. 2007: An Introduction to Rehabilitation Engineering Taylor & Francis.
- Cook, A.M. and Polgar, J.M. 2008: Cook & Hussey's Assistive Technologies: Principles and Practice. 3rd Edition, Elsevier.
- Kroemer, K.H.E. 2009: Fitting the Human: Introduction to Ergonomics. Sixth Edition, CRC Press.

Practicals/Tutorials: Students are encouraged to familiarize themselves with AppInventor (<http://appinventor.mit.edu/>). A Google account is needed to access the software. The student should provide evidence of performing all tutorials requested to achieve full marks. 2.5 marks are awarded per tutorial (4 tutorials = 10 marks, counting for 10% of final grade). No marks can be awarded for tutorials which have not been attempted.

Guest Lectures: Through the semester, guest presenters have been invited to provide an insight into areas of rehabilitation engineering and technologies which can aid disabled groups.

Grading: The final grade will reflect the student's achievement of the learning objectives. This will be measured through two assignments, paper presentation and class participation. There are no exams for this course. The distribution of percentages among these components is given below:

Assignment 1 (Group)	40%
Assignment 2 (Group)	45%
Tutorials (4)	10%
Participation	5%

Grading Standards: IS instructors are expected to have exams and evaluations which result in a reasonable distribution of grades. With respect to the final letter grades, the University's Undergraduate Catalogue states that, "A indicates superior achievement; B, good performance; C, adequate performance; D, minimal performance; F, failure". There is specifically no mention of any numerical scores associated with these letter grades. Final letter grades in this course conform to the University's officially published definitions of the respective letter grades. In accordance with the published University grading policy, it is important to understand that final letter grades reflect academic achievement and not effort. While mistakes in the arithmetic computation of grades and grade recording errors will always be corrected, it is important to understand that in all other situations final letter grades are not negotiable and challenges to final letter grades are not entertained. Historical data suggests an "A" may be in the 91-100 range, a "B" may be from 81-89 and "C" grades range from 70-80. All points from assignments and exams are additive for the semester. Each student starts at zero points which is an "F", any other grade must be earned.

Note: From Fall 2010, instructors have the option of assigning grades including a plus or minus (e.g. B+) to graduate students enrolled in graduate classes. It is up to each individual instructor's discretion as to whether this form of grading will be used during the semester.

Assignments: The assignments will result in a total of 85% of your semester grade. A maximum of 80 points can be awarded for Assignments 1 and 2. When submitting an assignment, be aware that numerous delays can occur. For example, computer failures, system performance issues, printing problems and

other commitments. It is essential that students are able to organize their time effectively, to ensure that deliverables are handed-in on time. If an assignment is not in on time, it may possibly be accepted following the due date with an accompanying reduction of the 50% of the earned grade. If you do not hand-in an assignment, you will receive a zero grade. Grading rubrics are described in the accompanying documentation for each assignment.

Writing Reports and Deliverables

- Page limits have been specified for each assignment (excluding cover page, table of contents and references). These should be adhered to, as the instructor will not read further than the page limits specified.
- Staple the report together, rather than using a folder.
- On a cover page, clearly present your name or names of those in the group, email address and title of the assignment.
- Use appropriate formatting (text size 10 point), 1.5 spacing, and always number pages.
- Ensure that work is proof-read.
- When citing or quoting existing work, always include appropriate references.

All students are required to research into an area where rehabilitation interfaces have been employed. A list of topics will be presented in the first class. Students are expected to use the UMBC library, digital libraries and various databases to obtain research papers from respected conferences and journals for the Assignment. All students working in groups are required to participate equally in project work. If one or more student(s) are not performing their fair share of work, their marks will be reflected accordingly.

Participation: For most classes, class participation is listed as a factor that contributes to a students' overall grade for a class. Performing assigned reading, attending class, and participating in classroom discussions, presentations and activities are considered normal and expected contributions to the class. To receive an above average grade a student must participate beyond this norm in a noteworthy way. This participation may occur in the classroom or outside of class. One example of this could be active participation in discussions on the class Blackboard site. Failure to contribute sufficiently in or outside class will result in a lower than average grade. Lateness to class may affect this grade. If you miss a class, you are responsible for getting the relevant notes and hand outs to help you prepare for the exams. This component will result in a total of 5% of your semester grade.

Course Policies:

- **Assignments:** Submissions are due in class on the specified dates.
- **Communication:** Feel free to contact me by coming to my office (either during my office hours, or by making an appointment). You are also encouraged to send me email (rkuber@umbc.edu). Make sure you add "HCC 742" in the subject of the email and you use your UMBC email account. Emails sent to me from non-UMBC providers (e.g. verizon.net, gmail.com, comcast.net, etc.) may be filtered out and never arrive in my mailbox.
- **Make-up Exams:** There will be NO make-up exams unless an emergency occurs and an official document is submitted, verified, and pre-approved by the instructor. Notify the instructor immediately and before the class exam takes place. Important Note: Having multiple exams in the same day does not constitute a valid reason for a make-up exam.
- **Re-grading:** I will review any graded exam or assignment if you believe the grade you received was not appropriate. You have one week after the graded assignment is delivered to the class, to return it to me with a written statement discussing why you believe the item in question deserved a different grade. Please note that the entire assignment will be reviewed and your final assignment grade may be raised or lowered as a result of the review.
- **Extra Credit:** Simply stated, it does not exist, especially on an individual basis.

- **Absence:** In the case of absence due to emergency (e.g. illness), religious holiday, or participation in an official UMBC function, it is the student's responsibility to confer with the instructor regarding the absence and missed work.
- **Readings:** Students are expected to read the materials that will be discussed in the class before the class meeting.
- **Cell phones and beepers:** All cell phones and beepers must either be turned off or set to a silent method of operation (e.g., vibrating rather than beeping). If you must answer a call, please leave the classroom. As with arriving late, if you disrupt the class you will be asked to leave the classroom.

Academic integrity: By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory. Acts of Academic Misconduct are defined as the following:

- **Cheating:** Knowingly using or attempting to use unauthorized material, information, or study aids in any academic exercise.
- **Fabrication:** Intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
- **Facilitating Academic Dishonesty:** Intentionally or knowingly helping or attempting to help another commit an act of academic dishonesty.
- **Plagiarism:** Knowingly representing the words or ideas of another as one's own in any academic exercise, including works of art and computer-generated information/images.

Available Support Services: Utilize the resources that are provided to you by the University. Besides, you pay for them through your tuition, so why not to use them?

- The UMBC Writing Center is a resource I highly recommend to all students who need some help in writing.
- Blackboard. Various types of information will be posted on Blackboard, ranging from external links to a specific article relevant to the course, to internships available for IS students. Check the "Information" area in the course Blackboard site.
- UMBC is committed to eliminating discriminatory obstacles that disadvantage students based on disability. Student Support Services (SSS) is the UMBC department designated to receive and maintain confidential files of disability-related documentation, certify eligibility for services, determine reasonable accommodations, develop with each student plans for the provision of such accommodations, and serve as a liaison between faculty members and students regarding disability-related issues. If you have a disability and want to request accommodations, contact SSS in the Math/Psych Bldg., room 213 or at 410-455-2459. SSS will require you to provide appropriate documentation of disability. If you require accommodations for this class, make an appointment to meet with me to discuss your SSS-approved accommodations."

Inclement Weather

In case of inclement weather, check the main UMBC Webpage (<http://www.umbc.edu>) to see whether UMBC is closed and classes are cancelled. Any work due on a class date that has been cancelled due to inclement weather will be due the next class meeting.

Using Lab Computers

During lab times, it is essential that computers are used for activities relating to class activities, and not for personal or entertainment purposes. This includes using the computer for email, instant messaging, chatting, surfing the Web, and other activities which are not relevant during the class. Students who indulge in any of the above will be asked to leave the classroom for the remainder of the session and a record will be made of the incident.

Class Evaluations

Information Systems Department class evaluations will be filled out online. You are strongly encouraged to fill out the evaluations online at the end of the semester and will be notified accordingly.

Tentative Schedule: Below is a tentative schedule of lecture topics. I reserve the right to adjust this schedule for any reason, but I will make every effort to advise you of any changes well in advance. Please note that for some sessions, I may be unavailable due to a scheduling clash (marked with an asterisk *). Another instructor may take the class, or alternatively students will be expected to perform the work set for the session independently. The work will be then discussed either on the Blackboard messageboard or in the next class.

Lecture	Date	Topic	Accompanying reading (Read chapter in advance of class)	Tutorial set	Tutorials due (onscreen for grading in lecture)	Assignments set/due
1	9/1	Introduction to class	Cook & Polgar – Chapter 1	T1		Assignment 1 set
2	9/8	Needs assessment Design and evaluation	Cook & Polgar – Chapter 4	T2	T1	
3	9/15	Seating systems Input/output devices Technology for sensory disabilities	Cooper et al. - Chapter 6	T3	T2	Assignment 2 set
4	9/22	Assistive technologies for cognitive augmentation AAC systems	Cook & Polgar – Chapter 11	T4	T3	
5	9/29	Technologies to enable mobility and running a usability study	Cooper et al. - Chapters 8 & 10		T4	
6	10/6	Guest Lecture: Educational technologies and interventions for children (Kennedy Krieger)				Assignment 1 Due
7	10/13	Game design	Rollings and Morris – Chapter 3			
8	10/20	Guest Lecture: Medication management design (Dr. Martin)				
*	10/27	No class – instructor at conference				
9	11/3	Guest Lecture: Adaptive interfaces (Dr. Martin)				
10	11/10	Guest Lecture: Rehabilitation engineering (Dr. Conn – V-LINC and JHU)				
11	11/17	Guest Lecture: Psychiatry (Dr. Young)				
12	11/24	Robotics, prosthetics and orthotics	Cooper et al. – Chapters 11, 12 & 13			
13	12/1	Ergonomics and workspace design	Kromer – Chapters 18 & 20			Assignment 2 papers and posters due
14	12/8	Project presentations based on Assignment 2				
15	12/15 (3.30- 5.30pm)	Keeping this finals week session on the calendar incase earlier sessions are cancelled due to inclement weather				