Interdisciplinary Research Seminar: Virtual Environments for Health Science Applications

Course Number and Section: DIG6840C (Section: 05D6) SPRING 2012
Meeting Times and Location: Tuesdays, 6th-8th periods, CSE E413
Prerequisite: None
Credit Hours: 3.0
Instructor: Angelos Barmpoutis
Instructor Office Location and Hours: CSE E428, hours to be announced
Instructor Contact Information: angelos@digitalworlds.ufl.edu

Course Description: Interdisciplinary Research Seminar provides diverse presentations, hands-on projects and interactive experiences that take full advantage of emergent real-time 3D virtual environments. This semester the course will have a special focus on the use of Virtual World Environments (VWE) for Health Science Applications. Students will investigate the history of virtual worlds and survey their current state in medical applications, including rehabilitation virtual environments, systems for computer assisted surgery, medical simulation, and virtual training systems. The course will also provide an overview of the implications of VWEs for human interaction, ethics and public policy in the near and long term.

Course Objectives/Goals: During this course the students will design their own virtual environments, they will work on processing and visualizing medical data, they will learn how to digitize real objects using various 3D scanning tools, they will collect motion data from various human-computer interaction devices (such as Microsoft’s Kinect, and Haptic mouse) and use the acquired data in their individual as well as group research projects.

Course Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to Virtual Environments</td>
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<td>2</td>
<td>Medical Imaging: From 2D to 3D</td>
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<td>3</td>
<td>Designing 3D Environments</td>
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<td>4</td>
<td>3D Scanning Techniques</td>
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<td>5</td>
<td>Visualizing multi-dimensional spaces</td>
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<td>6</td>
<td>Augmented Reality in Hospitals</td>
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<td>7</td>
<td>Human-Computer Interaction for Computed Assisted Surgery</td>
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<td>8</td>
<td>Medical Data Collection from Virtual Environments</td>
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<td>9</td>
<td>Simulating Real Dynamic Environments</td>
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<td>10</td>
<td>Individual Project Presentations</td>
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<td>11</td>
<td>Haptic-Devices for Simulation and Interaction</td>
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<td>12</td>
<td>Application: Virtual Hospital</td>
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<td>13</td>
<td>Application: Virtual Environments for Rehabilitation</td>
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<td>14</td>
<td>Application: Virtual Doctor at Home</td>
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<td>15</td>
<td>Group Project Presentations</td>
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### Grading Scale

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>% Equivalency</th>
<th>GPA Equivalency</th>
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<tbody>
<tr>
<td>A</td>
<td>94 – 100%</td>
<td>4.0</td>
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<tr>
<td>A-</td>
<td>90 – 93%</td>
<td>3.67</td>
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<tr>
<td>B+</td>
<td>87 – 89%</td>
<td>3.33</td>
</tr>
<tr>
<td>B</td>
<td>84 – 86%</td>
<td>3.00</td>
</tr>
<tr>
<td>B-</td>
<td>80 – 83%</td>
<td>2.67</td>
</tr>
<tr>
<td>C+</td>
<td>77 – 79%</td>
<td>2.33</td>
</tr>
<tr>
<td>C</td>
<td>74 – 76%</td>
<td>2.00</td>
</tr>
<tr>
<td>C-</td>
<td>70 – 73%</td>
<td>1.67</td>
</tr>
<tr>
<td>D+</td>
<td>67 – 69%</td>
<td>1.33</td>
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<tr>
<td>D</td>
<td>64 – 66%</td>
<td>1.00</td>
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<tr>
<td>D-</td>
<td>60 – 63%</td>
<td>.67</td>
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<td>E, I, NG, S-U, WF</td>
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### Evaluations and Grades

- 30% of the final grade comes from Homework Assignments
- 30% of the final grade comes from Individual Project
- 10% of the final grade comes from Attendance & Participation
- 30% of the final grade comes from Group Project

### 1) Class Attendance/Demeanor Policy

Policy on Absences

a. At the sole discretion of the instructor, documented Emergencies or medical situations may be the only acceptable reasons for an excused absence. At the very least, students must contact the Instructor 24 hours before class time if they wish to be considered for an excused absence.
b. Unexcused absences will accrue to the detriment of the portion of the final grade given for class participation.

### 2) OFFICE HOURS and RELATED POLICIES (Making Up Exams or Late Submissions, etc)

Office Hours for Student Consultation

a. The course instructor will post and hold weekly office hours for face-to-face meetings
b. Students are encouraged to begin assignments early enough such that instructors can provide assistance during regularly scheduled office hours if needed

Late policy

a. At the sole discretion of the instructor, late work may be penalized according to the late policy.
b. Any assignment turned in past the due date may lose up to 10% of the total point value of the assignment for each class day it is late.

Policy on Making up Exams

a. At the sole discretion of the instructor, Exams may or may not be taken late. Documented Emergencies or medical situations may be the only accepted reasons for an excused absence on the day of an exam.
b. Any assignment turned in past the due date may lose up to 10% of the total point value of the assignment for each class day it is late.

### 3) Students with disabilities

Instructor will make every attempt to accommodate students with disabilities. At the same time, anyone requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide you with the necessary documentation, which you must then provide to Instructor when requesting accommodation.
4) Require texts and other materials

The instructor will provide you with several articles as well as useful on-line tutorials and resources.

**Suggested Books**

**Suggested Articles**

5) Critical Dates

The final group project presentation will take place during our last class meeting.

6) Academic Honesty

The university’s policies regarding academic honesty, the honor code, and student conduct related to the honor code will be strictly enforced. Full information regarding these policies is available at the following links:

- Academic Honesty: [http://www.registrar.ufl.edu/catalog/policies/students.html#honesty](http://www.registrar.ufl.edu/catalog/policies/students.html#honesty)

7) University Counseling Services

Contact information:

**Counseling Center**
Address:
3190 Radio Rd.
P.O. Box 112662, University of Florida
Gainesville, FL 32611-2662
Phone: 352-392-1575
Web: [www.counsel.ufl.edu](http://www.counsel.ufl.edu)
8) UF Computer Policy  
   a. In keeping with the University of Florida's student computer policy [http://training.helpdesk.ufl.edu/computing.shtml](http://training.helpdesk.ufl.edu/computing.shtml) all assignments completed for this class should be typed using a word processing program. Use of spellchecking and grammar-checking programs is strongly encouraged. Excessive spelling/grammar errors detract from quality of scholarship, and will be appropriately assessed.  
   b. Use of desktop publishing software and computer generated graphics for course deliverables that may eventually be included in student's portfolios is also strongly encouraged.

9. EMAIL and Response times  
   a. All students must maintain and USE their registered Gatorlink email address for email communications related to the class  
   b. Students will be contacted via their registered Gatorlink email address with any course updates or other items of pertinence to the course.  
   c. Students are expected to read their Gatorlink email at least once during every business day.  
   d. Allow a minimum of 24 business hours for the Instructor to reply to email from students.

10. Student Concerns  
   a. If you have any concerns or questions about any situation in the course please consult the instructor ASAP.  
   b. If after consultation with the Instructor, the student has unresolved concerns or questions, they may request an appointment with the program director.

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