INTERDISCIPLINARY RESEARCH SEMINAR

COURSE NUMBER: DIG6840	CREDIT HOURS: 3.0
SEMESTER/YEAR: SPRING 2017	CLASS LOCATION: CSE E413
Instructor: ANGELOS BARMPOUTIS, PH.D.	CLASS MEETING TIME(S): T 4TH & TH 4-5 PERIODS
EMAIL: ANGELOS@DIGITALWORLDS.UFL.EDU	**OFFICE LOCATION/HOURS: NRG M & W 3RD PERIOD**
CONTACT PHONE: (352) 294-2000	**COURSE WEBSITE:** DIGITALWORLDS.UFL.EDU/PROGRAMS/MA-IN-DAS/

COURSE DESCRIPTION

Interdisciplinary Research Seminar provides diverse presentations, hands-on research projects and interactive experiences that take full advantage of emergent computing technologies. Students will investigate a variety of research computing applications, including virtual environments for rehabilitation, big-data visualization, interactive museums, simulations for automobile safety, systems for computer assisted surgery, and others. The course will also provide an overview of 3D scanning technologies, sensors for natural user interaction, devices for haptic feedback, and will discuss the implications of virtual environments for human interaction, ethics and public policy in the near and long term.

PREREQUISITE KNOWLEDGE AND SKILLS

None

PURPOSE OF COURSE

During this course the students will be exposed to several funded research projects at the University of Florida in various areas of research computing, including data visualization, medical applications, natural human-computer interaction, digital humanities, automobile safety and others. The students will design their own virtual environments, they will work on processing and visualizing various forms of data, they will learn how to digitize real objects using state-of-the-art 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. As part of their final project the students will have to write a research paper using the standard guidelines and structure followed by popular research computing societies.

COURSE GOALS AND/OR OBJECTIVES:

By the end of this course, students will be able to:

1. Form a research hypothesis.

2. Design a data collection study.

3. Write an IRB protocol.

4. Collect data and analyze them in the form of a research paper.

COURSE SCHEDULE:

FINAL PROJECT PRESENTATIONS WILL BE HELD IN CLASS ON APRIL 17 & APRIL 19.

DIG6840 – Interdisciplinary Research Seminar

Week	Topic	Assignments
1	Introduction to Research protocols and forming hypothesis	
2	Virtual Environments as research tools	
3	Digital Imaging Technologies: From 2D to 3D	
4	3D Scanning Techniques	
5	Visualizing multi-dimensional spaces	
6	Interacting in 3 dimensions, Natural User Interfaces	
7	Simulating Real Dynamic Environments	
8	Haptic-Devices for Simulation and Interaction	
9	Human-Computer Interaction for Computed Assisted Surgery	
10	Individual Project Presentations	**Individual Projects due**
11	Data Collection and Quantitative Analysis	
12	Application: Virtual Environments for Rehabilitation	
13	Application: Digital Epigraphy and Archaeology	
14	Application: Smart Sensors for Connected Vehicles	
15	Group Project Presentations	**Final Paper and Group Project due**

REQUIRED TEXTBOOKS AND SOFTWARE:

There are no required textbooks. There will be suggested books and articles listed below in the section of recommended materials.

RECOMMENDED MATERIALS:

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

Suggested Books

Sherman, W.R., Craig, A.B. (2003) *Understanding Virtual Reality.* Morgan Kaufmann

Bowman, D.A., Kruijff, E., Laviola, J.J., Poupyrev, I. (2005) *3D User Interfaces: Theory and Practice.* Addison-Wesley

Earnshaw, R.A., Vince J. (1995) *Computer Graphics: Developments in Virtual Environments.* Academic Press

Begault, D. R. (1994) *3D Sound for virtual reality and multmedia.* Academic Press, London

Durlach, N.I., Mavor, A.S. (1995) *Virtual reality: scientific and technological challenges.* National Academy Press

Stuart, R. (2001) *The Design of Virtual Environments.* Barricade Books

DIG6840 – Interdisciplinary Research Seminar

Suggested Articles

Blackwell, M., Morgan, F., DiGioia, A. M. (1998) *Augmented reality and its future in orthopaedics.* Clinical Orthopaedics and Related Research 354, S. 111-122

Bakker, N. H., Werkhoven, P. J., Passenier, P. O. (1999) *The effects of proprioceptive and visual feedback on geographical orientation in virtual environments.* Presence: Teleoperators and Virtual Environments 8, S. 36-53.

Dawson, S. L., Kaufman, J. A. (1998) *The imperative for medical simulation.* Proceedings of the IEEE 86, S. 479-483.

Glantz, K., Durlach, N. I., Barnett, R. C., Walter, A. A. (1997) *Virtual reality (VR) and psychotherapy: opportunities and challenges.* Presence: Teleoperators and Virtual Environments 6, S. 87-105.

Padmos, P., Milders, M. V. (1992) *Quality criteria for simulator images: A literature review.* Human Factors 36, S. 727-748.

Tang, S. L., Kwoh, C.K., Teo, M. Y., Sing, N. W., Ling, K. V. (1998) *Augmented reality systems for medical applications.* IEEE Engineering in Medicine and Biology Magazine 17, S. 49-58.

MATERIALS AND SUPPLIES FEES:

Material and supply fees are assessed for certain courses to offset the cost of materials or supply items consumed in the course of instruction. A list of approved courses and fees is published in the Schedule of Courses each semester. (UF-3.0374 Regulations of the University of Florida)
Material and supply and equipment use fee information is available from the academic departments or from the schedule of courses (Florida Statutes 1009.24). The total M&S for this class is $9.40

EVALUATION OF GRADES

Assignment	Total Points	Percentage of Grade
Weekly Homework projects: The students will receive homework assignments related to the material covered classe. The students will have 1 week to work on each homework assignment. The assignments will be submitted through the course's learning management system.	30	30%
Individual Project –It is expected that in this assignment, students manifest their knowledge on forming a hypothesis and designing a research study.	25	25%
Participation – Students are expected to actively participate in class discussions, both in class as well as online by writing peer reviews.	10	10%
Group Project / Final Paper – Final Project is the final result of the semester long effort in learning. It is expected that in this final assignment, students manifest their knowledge on the matter, and successfully deploy this knowledge in the practical format of a group project.	35	35%

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DIG6840 – Interdisciplinary Research Seminar

Letter Grade	% Equivalency	GPA Equivalency
A	94 – 100%	4.0
A-	90 – 93%	3.67
B+	87 – 89%	3.33
B	84 – 86%	3.00
B-	80 – 83%	2.67
C+	77 – 79%	2.33
C	74 – 76%	2.00
C-	70 – 73%	1.67
D+	67 – 69%	1.33
D	64 – 66%	1.00
D-	60 – 63%	.67
E, I, NG, S-U, WF		0.00

More information on grades and grading policies is here:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

COURSE POLICIES:

PARTICIPATION / ATTENDANCE POLICY
We value participation more than mere attendance. Each Instructor is responsible for communicating the specific details of what percentage of your grade (if any) will be assigned to participation, and how class participation will be measured and graded.

MAKE-UP POLICY
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.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

COURSE TECHNOLOGY
The students will be required to have access to, and use a personal computer with the access to the Internet. Word editing software will be required for written assignments.

DIG6840 – Interdisciplinary Research Seminar

COURSE COMMUNICATIONS
Students can communicate directly with the Instructor regarding the course material through the course management system (CANVAS).

UNIVERSITY HONESTY POLICY
UF students are bound by The Honor Pledge that states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."
The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conducthonor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

CLASS DEMEANOR
Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and restrict eating to outside of the classroom. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all.

STUDENTS REQUIRING ACCOMMODATIONS
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

NETIQUETTE COMMUNICATION COURTESY
All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats, more information can be found at: http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf

ONLINE COURSE EVALUATIONS
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

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CAMPUS RESOURCES

HEALTH AND WELLNESS

U Matter, We Care

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392- 1575 so that a team member can reach out to the student.

Counseling and Wellness Center
http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department, 392-1111 (or 9-1-1 for emergencies). http://www.police.ufl.edu/

ACADEMIC RESOURCES

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. http://www.crc.ufl.edu/

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. http://teachingcenter.ufl.edu/

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. http://writing.ufl.edu/writing-studio/

Student Complaints Campus:
https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf

On-Line Students Complaints:
 http://www.distance.ufl.edu/student-complaint-process

Disclaimer: This syllabus represents the instructor's current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.