WEARABLE AND MOBILE APP DEVELOPMENT

**COURSE NUMBER:** DIG4634  
**CREDIT HOURS:** 3

**SEMESTER/YEAR:** FALL 2019  
**CLASS LOCATION:** NRG 0120

**CLASS MEETING TIME(S):** M. 8-9TH & W. 9TH PERIOD

**INSTRUCTOR:** DR. ANGELOS BARMPOUTIS  
**OFFICE LOCATION/HOUR:** CSE428 W 8TH PERIOD

**CONTACT PHONE:** (352) 294-2000  
**CONTACT EMAIL:** ANGELOS@DIGITALWORLDS.UFL.EDU

**CLASS MEETING TIME(S):** M. 8-9TH & W. 9TH PERIOD

**CONTACT PHONE:** (352) 294-2000  
**CONTACT EMAIL:** ANGELOS@DIGITALWORLDS.UFL.EDU

**COURSE WEBSITE:** HTTP://ELEARNING.UFL.EDU/

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**COURSE DESCRIPTION**

This course will cover the software development protocols for wearable and mobile electronics such as head-mounted displays, watches and cell phones. Several embedded input/output interfaces will be studied including, position and orientation sensors, hand trackers, holographic and stereoscopic displays. The students will practice the covered material by developing prototype software applications for such devices.

**PREREQUISITE KNOWLEDGE AND SKILLS**

DIG3878 Applied Digital Media Protocols

**PURPOSE OF COURSE**

The purpose of this course is to communicate practices that revolves around wearable and mobile computing to students by engaging them in interactive sessions/tutorials and giving them hands-on experience in designing for wearable and mobile technologies available in the market.

**COURSE GOALS AND/OR OBJECTIVES:** At the conclusion of this course, students will be able to:

1. Obtain basic understand of the technologies used in contemporary wearable and mobile devices.
2. Understand the characteristics and design elements required for wearable devices and systems to be widely adopted by the mainstream population for use in everyday life.
3. Develop software development skills for wearable and mobile devices.

**COURSE SCHEDULE:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Sample Assignments/Quizzes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>History of augmented and mixed reality.</td>
<td>• Read parts 1.1 and 1.3 from Dvorak</td>
</tr>
<tr>
<td>2</td>
<td>Principles of wearable and mobile interfaces.</td>
<td>• Read part 4 from Dvorak</td>
</tr>
<tr>
<td>3</td>
<td>Application Programming Interfaces (APIs) for wearable and mobile devices.</td>
<td>• Read chapter 1 from Ruiz and Goransson</td>
</tr>
<tr>
<td>4</td>
<td>Computer graphics generated stereoscopy</td>
<td>• Homework on drawing stereoscopic image using image editing / painting tools</td>
</tr>
</tbody>
</table>
5 Programming head-mounted displays
   • Homework on Side-by-side, Cyan-Red, Fish eye rendering

6 Position and orientation tracking
   • Selected chapters from from Ruiz and Goransson
   • Homework on accelerometer, gyroscope
   • Individual project proposal due

7 Real-time camera feedback and processing
   • Examples from Kinect

8 Biometric feedback from wrist-based interfaces

9 Individual project presentations
   • Individual project submission

10 Developing augmented-reality applications
    • Group project proposal due

11 Review of mobile applications
    • Homework on mobile app development

12 Review of wearable applications
    • Read part 1.2 from Dvorak

13 Principles of natural user interfaces
   Mainstream wearable design
    • Read part 2 from Dvorak
    • Examples from LeapMotion

14 The future of wearable devices
    • Read part 5 from Dvorak

15 Group project presentations
    • Group project submission

16 Review and Final Remarks

REQUIRED TEXTBOOKS AND SOFTWARE:


RECOMMENDED MATERIALS:

1. Android Studio
2. Oculus GO / webVR resources
3. Unity + HTC VIVE, Unity + Oculus, Unity + Hololens

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 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 $13.50

**EVALUATION OF GRADES**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Total Points</th>
<th>Percentage of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual project (midterm):</strong> Towards the middle of the semester each student is expected to work on an individual project on mobile and/or wearable app development. The app developed by each student will be evaluated in terms of originality and complexity and demonstrated in class.</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Weekly assignments:</strong> There will be weekly or bi-weekly assignments, in which the students will be asked to perform an app development task, such as develop a small-scale app for a mobile device.</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Attendance and Participation</strong> – Students are expected to actively participate in class.</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Final project (group project):</strong> Final project is the final result of the semester long effort in learning. It is expected that in this final assignment, students organized in groups manifest their knowledge on the matter, and successfully deploy this knowledge in the practical format.</td>
<td>30</td>
<td>30%</td>
</tr>
</tbody>
</table>

**GRADING SCALE:**

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>% Equivalency</th>
<th>GPA Equivalency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>94 – 100%</td>
<td>4.0</td>
</tr>
<tr>
<td>A-</td>
<td>90 – 93%</td>
<td>3.67</td>
</tr>
<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>
</tr>
<tr>
<td>D</td>
<td>64 – 66%</td>
<td>1.00</td>
</tr>
<tr>
<td>D-</td>
<td>60 – 63%</td>
<td>.67</td>
</tr>
<tr>
<td>E, I, NG, S-U, WF</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

More information on grades and grading policies is here:  
[https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)
PARTICIPATION / ATTENDANCE

In our course, attendance for On-Campus and RT On-Line students is mandatory. Students are allowed three unexcused absences. If you miss more than three classes during the semester, each additional absence will lower your overall grade by 100 points. If you miss more than six classes, you will fail the course. Exempt from this policy are only those absences involving university-sponsored events, such as athletics and band, and religious holidays, family emergencies, and health issues for which you must provide appropriate documentation in advance of the absence.

Additionally, tardiness will not be tolerated. If you are tardy for three class periods, you will receive an unexcused absence.

YOT On-Line students will be expected to stay in sync with the rest of the class, and to achieve their participation portion by recording/writing their responses to course material in advance of each lecture at least once a week.

MAKE-UP POLICY

Unless discussed at least 72 hours in advance of the deadline, late assignments will not be accepted. Excluded from this policy are any assignments missed due to medical emergencies.

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 COMMUNICATIONS

Students can communicate directly with the Instructor regarding the course material through UF e-Learning. http://elearning.ufl.edu/

COURSE TECHNOLOGY SUPPORT:

The Technology Support Center provides computer support for Digital Worlds students who access Visimeet, lecture recordings, student equipment, facilities and other technology-based resources. http://digitalworlds.ufl.edu/support

For computer assistance related to Visimeet, lecture recordings, student equipment, and facilities request please Submit a Help Ticket or email support@digitalworlds.ufl.edu.

For support related to account services, technical consulting, mobile device services, software services, administrative support, application support center, and learning support services, please contact
Wearable and Mobile App Development

the **UF Computer Help Desk** available 24 hours a day, 7 days a week at 352-392-4357 or helpdesk@ufl.edu.

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**UF POLICIES:**

**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](http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf) 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](http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf) (352-392-8565) 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](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. 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 [evaluation results](http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf).

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**CAMPUS RESOURCES**

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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:

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 ex