

Course Title	<b>Interactive System Design for Web Systems</b>				
Course Code	<b>DLWSS550</b>				
Course Type	<b>Elective</b>				
Level	Master (2nd Cycle)				
Year / Semester	1 / 2				
Teacher's Name	<b>Andreas Constantinides, PhD</b> <b>Achilleas Achilleos, PhD</b>				
ECTS	10	Lectures / week	3	Laboratories / week	0
Course Purpose and Objectives	<p>Human Computer Interaction (HCI) is the area that focuses on the design and use of computer technologies with emphasis on User Interface (UI) design as well as the utilization of novel design ways and tools that human beings use and interact with computers. Interactive Design (ID) is the area in HCI that particularly deals with the interaction between human and computers and tries to make systems usable. It focuses more on User Experience Research and User Experience Design. In particular, ID tries to understand what is going on in the interaction between users and systems as well as what the user wants and what the system does. For example, it examines the ergonomics (i.e., the digital/physical characteristics of the interaction) and how these influence its effectiveness, it studies how the dialog between user and system is influenced by the style of the interface as well as the social and organizational context that the interaction takes place, which affects both the user and the system and many more.</p> <p>Moreover, with the advancements in Web Systems and Ubiquitous Computing devices the need for designing human computer interfaces that can interpret and support user's intentions by utilizing modern and advance web technologies is greater than ever. Thus, this specialization course also includes a practical orientation in client-side application design and development, as well as server-side service development using advanced internet technologies. It will focus on learning practical skills, techniques and best practices used for the modern and rapid development of full-stack, open-source JavaScript-based applications. Finally, it overviews the main challenges and implications of the Semantic Web, Internet 2.0 and Cloud computing for advanced web application development.</p> <p>The purpose of this course is to provide students with the knowledge of the essential tools and techniques in order to extend critical awareness of the issues and challenges associated with human computer interaction and interactive system design, enhance their understanding on interactive design on web and mobile systems, to enable students to learn advanced interaction design techniques, such as adaptive and responsive design, and to become acquainted with cutting-edge web technologies and apply them in practice for full stack web application development.</p>				

Learning Outcomes	<p>By the end of the course, students should be able to:</p> <ul style="list-style-type: none"> <li>• Describe the emerging topics on Human Computer Interaction (HCI) design in making more comprehensive and user-friendly computer-based systems.</li> <li>• Identify and clearly describe the main challenges and issues on HCI and Interactive Design.</li> <li>• Understand the theoretical dimension of human factors in the acceptance of computer interfaces and identify the impact of usable interfaces in the performance of Mobile and Web systems.</li> <li>• Understand modern concepts, principles and methods for implementing advanced Internet application tools.</li> <li>• Identify techniques and practices across various platforms and tools for designing interactive interfaces, standardization, analysis and evaluation.</li> <li>• Critically evaluate various web technologies and web systems and identify their strengths and weaknesses.</li> <li>• Demonstrate creative skills in designing competing user interfaces in web and mobile systems.</li> <li>• Familiarize with advanced internet technologies and implement them in practice for full-stack web development.</li> </ul>		
Prerequisites	DLWSS502	Required	None
Course Content	<p>This course consists of the following six units:</p> <ul style="list-style-type: none"> <li>• <b>Unit 1</b> is the introductory session for the whole module</li> <li>• <b>Units 2 and 3</b> deals with topics related to human and computer systems.</li> <li>• <b>Unit 4</b> deals with selected topics on HCI such as prototyping techniques, requirement and task analysis, personas and task description techniques.</li> <li>• <b>Unit 5</b> focuses on the evaluation of prototypes, UIs and systems design.</li> <li>• <b>Units 6 and 7</b> focuses on applying advance client side frameworks and tools for web interface design (Bootstrap.js) and web application development (Angular.js)</li> <li>• <b>Unit 8</b> deals with server-side web-system architectures and tools (Express.js, Node.js, MongoDB) for implementing web services (Restful Web APIs)</li> <li>• <b>Unit 9</b> deals with business models for web application development with Internet 2.0 AND Cloud Computing tools</li> </ul>		
Teaching Methodology	<p><b>Mode of Delivery: Distance Learning</b></p> <p>The course is designed to introduce and explain the material students are expected to learn through an on-line learning environment. The on-line environment provides an opportunity for receiving on-line feedback from the Course Instructor during their study. In addition, students will be</p>		

	<p>encouraged to interact both with other students and the instructor so as to feel part of an on-line community of learners that belong to the University network.</p> <p>The course content will be delivered through online material/notes, recorded lectures and/or narrated presentations. Therefore, students may be asked to download and study notes, tutorials and numerical exercises as well as watch recorded lectures/demonstrations or narrated presentations posted on the web addressing the main concepts of a particular unit.</p> <p>Furthermore, the planned communication and the dynamic/online interaction activities between the course instructor and the students will include asynchronous communication tools (Discussion Forum) that students may be asked to participate, wherever appropriate, in an online forum posting their views on certain topics covered in a particular unit; and synchronous communication tools (instant messaging, such as Skype, chat rooms, video-conferencing, etc.), that students may discuss on-line with the Instructor (s) and/or other students specific issues covered in a given unit.</p> <p>Moreover, a number of case study readings are also considered, so as to demonstrate the relevance and practical applicability of mobile and ubiquitous computing methods and systems covered in the various units of this course. Case-studies can illustrate that what students have studied in each unit is not just of academic or theoretical value but also has value in terms of improving real-life challenges.</p>
Bibliography	<p>The following textbooks are associated with topics considered at various points throughout this course:</p> <ul style="list-style-type: none"> <li>• Simon Holmes, Clive Herber, “Getting MEAN with Mongo, Express, Angular, and Node”, 2nd Edition, Paperback: 504 pages, Publisher: Manning Publications; 2 edition (May 10, 2019), Language: English, ISBN-10: 1617294756, ISBN-13: 978-1617294754A. Dix et al. (2004), Human-Computer Interaction third edition, Prentice Hall, 2004.</li> <li>• Caesar Wu and Rajkumar Buyya, “Chapter 1 - Cloud Computing, Cloud Data Centers and Cost Modeling, A Complete Guide to Planning, Designing and Building a Cloud Data Center”, 2015, Pages 3-41, Available online 6 March 2015, <a href="https://doi.org/10.1016/B978-0-12-801413-4.00001-5">https://doi.org/10.1016/B978-0-12-801413-4.00001-5</a>. Sven</li> <li>• Brennon Williams (2011), Microsoft Expression Blend 4 Unleashed, Pearson, 2011</li> <li>• Casteleyn, Florian Daniel, Peter Dolog, Maristella Matera, “Engineering Web Applications”, Book: Data-Centric Systems and Applications, 2009, ISBN: 978-3-540-92200-1 (Print) 978-3-540-92201-8 (Online).</li> <li>• Pressman R.S. and D. Lowe, “Web Engineering”, Mc. Graw-Hill (2009).</li> <li>• J. Preece et al. (2002), Interaction Design, Wiley, 2002</li> </ul> <p>The above textbooks are recommended as sources of additional reading</p>

for students so as to elaborate on the course's material. Students can also find additional examples that they can use for practice.

Furthermore, students are also encouraged to explore other online / print sources that are related to topics covered in this course.

Additional material include the following:

- Sunyaev A. (2020) Cloud Computing. In: Internet Computing. Springer, Cham. [https://doi.org/10.1007/978-3-030-34957-8\\_7](https://doi.org/10.1007/978-3-030-34957-8_7).
- L.M. Gomes, F. Martins F. and H. Guerra, "Teaching Web Programming Using the MEAN Stack", In: Auer M., Hortsch H., Sethakul P. (eds) The Impact of the 4th Industrial Revolution on Engineering Education. ICL 2019. Advances in Intelligent Systems and Computing, vol 1135. Springer, Cham, March 2020. [https://doi.org/10.1007/978-3-030-40271-6\\_26](https://doi.org/10.1007/978-3-030-40271-6_26).
- Li, Katie, et al. "Categorisation of visualisation methods to support the design of Human-Computer Interaction Systems." Applied ergonomics 55 (2016): 85-107.
- Salem, Maha, et al. "Would you trust a (faulty) robot?: Effects of error, task type and personality on human-robot cooperation and trust." Proceedings of the Tenth Annual ACM/IEEE International Conference on Human-Robot Interaction. ACM, 2015.
- Dhouib, Amira, et al. "A framework for supporting the choice of usability evaluation methods for interactive adaptive systems." 2015 15th International Conference on Intelligent Systems Design and Applications (ISDA). IEEE, 2015.
- Desurvire, Heather, and Charlotte Wiberg. "User Experience Design for Inexperienced Gamers: GAP—Game Approachability Principles." Game User Experience Evaluation. Springer International Publishing, 2015. 169-186.
- Jensen, Sanne, Andre W. Kushniruk, and Christian Nøhr. "Clinical simulation: A method for development and evaluation of clinical information systems." Journal of biomedical informatics 54 (2015): 65-76.
- A. J. Poulter, S. J. Johnston and S. J. Cox, "Using the MEAN stack to implement a RESTful service for an Internet of Things application," 2015 IEEE 2nd World Forum on Internet of Things (WF-IoT), 2015, pp. 280-285, doi: 10.1109/WF-IoT.2015.7389066. <https://eprints.soton.ac.uk/383487/1/PID3973543.pdf>
- Panayiotis Andreou, Panagiotis Germanakos, Andreas Konstantinidis, Dimosthenis Georgiadis, Marios Belk and George Samaras, "USN: Towards User-Centric Social Networks", International Conference on Web Information Systems and Technologies (WebIST), 2012
- S. Yau and H. An, "Software Engineering Meets Services and Cloud Computing," in Computer, vol. 44, no. 10, pp. 47-53, Oct. 2011, doi: 10.1109/MC.2011.267.
- Y. Wei and M. B. Blake, "Service-Oriented Computing and Cloud Computing: Challenges and Opportunities," in IEEE Internet Computing, vol. 14, no. 6, pp. 72-75, Nov.-Dec. 2010, doi: 10.1109/MIC.2010.147.
- E. B. Goldstein, Sensation and Perception, 6th edition, Wadsworth, 2001.
- M. Helander, editor, Handbook of Human-Computer Interaction. Part II: User Interface Design, North-Holland, 1988.

	<ul style="list-style-type: none"> <li>• ACT-R site (<a href="http://act-r.psy.cmu.edu/">http://act-r.psy.cmu.edu/</a>).</li> <li>• Website of resources and examples of the use of the cognitive architecture ACT-R, which is the latest development of Anderson's ACT model.</li> <li>• Code repository of the programming examples used in the "Getting MEAN with Mongo, Express, Angular, and Node", 2nd Edition book: <a href="https://github.com/simonholmes/getting-MEAN-2">https://github.com/simonholmes/getting-MEAN-2</a></li> <li>• The MEAN full stack JavaScript framework – in PDF format.</li> </ul>
Assessment	<p>The Students are assessed via continuous assessment throughout the duration of the Semester, which forms the Coursework grade and the final written exam. The coursework and the final exam grades are weighted 50% and 50%, respectively, and compose the final grade of the course.</p> <p>Various approaches are used for the continuous assessment of the students, such as dynamic online activities, online quizzes, group project design, implementation and presentation. The assessment weight, date and time of each type of continuous assessment is being set at the beginning of the semester via the course outline. An indicative weighted continuous assessment of the course is shown below:</p> <ul style="list-style-type: none"> <li>• <b>An online quiz</b> (10% of total marks for module)</li> <li>• <b>One marked assignment/project</b> (20% of total marks for module)</li> <li>• <b>Presentation of project</b> (10% of total marks for module)</li> <li>• <b>Two online participation activities</b> (10% of total marks for module)</li> <li>• <b>One closed-book, 3-hour exam</b> (50% of total marks for module)</li> </ul> <p>Students are prepared for final exam, by revision on the matter taught, problem solving and concept testing and are also trained to be able to deal with time constraints and revision timetable.</p> <p>The criteria considered for the assessment of each type of the continuous assessment and the final exam of the course are: (i) the comprehension of the fundamental concepts and theory of each topic, (ii) the application of the theory in solving related problems and (iii) the ability to apply the above knowledge in complex real-life problems.</p> <p>The final assessment of the students is formative and summative and is assured to comply with the subject's expected learning outcomes and the quality of the course.</p>
Language	English