Title (Units): **COMP7440 Web-based and Ubiquitous Health Care (3,2,1)**

Course Aims: This course covers the healthcare systems applicable to Web, social media, and ubiquitous environment. It will explain to students how the healthcare system can monitor patients and elderly as they maintain their normal everyday activities, through body sensors and home environment sensors. It will further introduce how the data are collected to make trend analysis, determine state of well-being and warn health workers of potential problems.

Prerequisite: Postgraduate Student Standing

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Explain the media or environment that enable ubiquitous healthcare systems
2	Identify different kinds of sensor technologies for data acquisitions and analysis
3	Explain how to make trend analysis and to prevent potential problems from happening
	Professional Skill
4	Design systems to monitor patients' activities through sensor networks
5	Apply the knowledge in the tracking of patients, localization, gesture and fall detection
	Attitude
6	Evaluate important issues and concerns related to data security and privacy

Calendar Description: This course covers the healthcare systems applicable to Web, social media, and ubiquitous environment. It will explain to students how the healthcare system can monitor patients and elderly as they maintain their normal everyday activities, through body sensors and home environment sensors. It will further introduce how the data are collected to make trend analysis, determine state of well-being and warn health workers of potential problems.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1-3	Students will learn the underlying techniques and technologies involved in ubiquitous healthcare systems via lectures, tutorials, and assignments.
4-5	Students will learn and gain hands-on experience on sensor networks and how patients' activities can be detect and monitored through tutorials and special lab demonstrations
6	Students will realize the importance of data security and privacy through case studies and discussions during lectures.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous assessment	40%	1-6	Continuous assessments are designed to measure how well the students have learned the underlying technologies for the Web-based Systems and Healthcare Information Systems. Students also have to understand how different sensor networks help to collect, organize, transmit and store for further analysis and responses. Students also have to do literature search and comparative studies to recognize the current advances in this field of study.
2	Examination	60%	1-3	Final examination questions are designed to see how far students have achieved their intended learning outcomes. Questions will primarily be

				analysis and skills based to assess the students' ability in this field of study.

Assessment Rubrics:

	Excellent (A)	**Good (B)**	**Satisfactory (C)**	**Fail (F)**
Explain the media or environment that enable ubiquitous healthcare systems	Fully understand the media or environment that enable ubiquitous healthcare systems	Understand most of the media or environment that enable ubiquitous healthcare systems	Sufficiently understand the media or environment that enable ubiquitous healthcare systems	Do not understand most of the media or environment that enable ubiquitous healthcare systems
Identify different kinds of sensor technologies for data acquisitions and analysis	Capable to identify different kinds of sensor technologies for data acquisitions and analysis	Capable to identify the right kind of sensor technologies for most of the data acquisitions and analysis	Capable to identify the kind of sensor technologies for normal data acquisitions and analysis	Not capable to identify any kind of sensor technologies for data acquisitions and analysis
Describe and Explain how to make trend analysis and to prevent potential problems from happening	Fully understand how to make trend analysis and to prevent potential problems from happening	Understand most of the cases on how to make trend analysis and to prevent potential problems from happening	Sufficiently understand the cases on how to make trend analysis and to prevent potential problems from happening	Do not know how to make trend analysis and to prevent potential problems from happening
Design and Explain systems to monitor patients' activities through sensor networks	Fully capable to design sophisticate systems to monitor patients' activities through sensor networks	Capable to design systems to monitor patients' activities through sensor networks	Capable to design a minimal system to monitor patients' activities through sensor networks	Not capable to design systems to monitor patients' activities through sensor networks
Acquire the knowledge in the tracking of patients, localization, gesture and fall detection	Fully capable to make use of the knowledge in the tracking of patients, localization, gesture and fall detection	Capable to make use of the knowledge in the tracking of patients, localization, gesture and fall detection most of the time	Capable to make use of the knowledge in the tracking of patients, localization, gesture and fall detection in some selected cases	Not capable to make use of the knowledge in the tracking of patients, localization, gesture and fall detection

Course Content and CILOs Mapping:

Content		**CILO No.**
I	Systems Overview	1,2
II	Healthcare Information Systems	1,2
III	Sensor Networks, Data Acquisitions and Analysis	2,4,5
IV	Case Studies	1-3,6

References:

- Cory Beard, William Stallings, Wireless Communication Networks and Systems, Pearson Education, 2015.
- Bill Phillips and Chris Stewart, Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides), 2nd edition, Wiley, 2015.
- Cameron Banga, Josh Weinhold, Essential Mobile Interaction Design: Perfecting Interface Design in Mobile, Pearson Education, 2015.
- David Mark an et. , Beginning iPhone Development with Swift: Exploring the iOS SDK, Apress, 2014.
- Greg Nudelman, Android Design Patterns: Interaction Design Solutions for Developers, Wiley, 2013.

- Aaron Saunders, Building Cross-Platform Apps using Titanium, Alloy, and Appcelerator Cloud Services, Wiley, 2014.
- T. Thomas-Brogan, Health Information Technology Basics: A Concise Guide to Principles and Practice, Jones & Bartlett Publishers, 2008.
- Ramona Nelson, and Nancy Staggers, Health Informatics: An Interprofessional Approach, Elsevier, 2013. ISBN-13: 978-0323100953, ISBN-10: 0323100953.
- Nadinia A. Davis, and Melissa LaCour, Health Information Technology (3rd Edition), Elsevier Saunders 2013. ISBN-13: 978-1437727364, ISBN-10: 1437727360.
- Robert E. Hoyt, and Ann Yoshihashi, Health Informatics: Practical Guide for Healthcare and Information Technology Professionals (6th Edition), Informatics Education, 2014. ISBN: 978-1-304-79110-8

Course Content:

Topic

I. Systems Overview
   A. The Internet and web-based systems
   B. Ubiquitous computing service
   C. Social media and mobile applications

II. Healthcare Information Systems
   A. Electronic patient record (ePR)
   B. Electronic health record (eHR)
   C. Personal health record
   D. Telemedicine/telehealth/remote medical expertise systems
   E. eHealth portal

III. Sensor Networks, Data Acquisitions and Analysis
   A. Body sensor network
   B. Personal area network
   C. Localization network
   D. Vital sign monitoring
   E. Gestures and fall detection
   F. Data storage and organization
   G. Data analysis

IV. Case Studies
   A. eHealth portal
   B. Ubiquitous healthcare services
   C. Location bracelet
   D. Gesture and fall detection
   E. Vital sign monitoring
   F. Personal emergency link
   G. Mobile applications in hospital/ward/clinic