DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COURSE SYLLABUS
EE 477: ESSENTIALS OF MEDICAL INFORMATICS

COURSE TITLE	*ENGLISH CODE/NO*	*SUBJECT AREA*	*QUARTER CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
ESSENTIALS OF MEDICAL INFORMATICS	EE 477	Engineering	4	1	-	**4**

Pre-requisites:	EE 370	
Course Role in Curriculum	*Required or Elective:*	Elective
	A pre-requisite for:	--

Catalogue Description:
Electronic Medical Record (EMR), hospital information system (HIS) standards and systems; image data compression, data communication and transmission, security and protection for medical image data. Picture archiving and communication systems (PACS), radiology information system (RIS), lab information system (LIS) and medical imaging informatics (MII) for filmless hospitals. A knowledge-based digital library for retrieving scenario specific medical text documents. Integrated multimedia patient record systems, computer-aided diagnosis (CAD), clinical decision support systems (CDSS). Medical robotics and computer-integrated interventional medicine. Molecular imaging in biology and pharmacology. The evolution of e-health systems and smart medical home.

*Textbooks***:**

1. Byron R. Hamilton, *Electronic Health Records*, second edition, McGraw Hill, 2011.
2. H. K. Huang, *PACS and Imaging Informatics* : basic principles and applications, John Wiley Blackwell, 2010.
3. Christi E. Carter, Beth L. Vealé, *Digital Radiology and PACS*, Mosby, 2010.
4. Alexander Peck, *Clark's Essential PACS. RIS and Imaging Informatics*, CRC Press, 2018.
5. Mark Ciampa, Mark Revels, *Introduction to Healthcare Information Technology*, Cengage Learning, 2012.

Supplemental Materials:
   1. Crystal Panek, Networking Fundamentals, Sybex, 2020.
   2. Instructor web site.

Course Learning Outcomes:
By the completion of the course the student should be able to:
1. **Identify** medical informatics needs of a healthcare facility.
2. **Explain** the implementation blocks of EMR and their functions
3. **Apply** medical informatics standards to medical informatics solutions
4. **Identify** the components, functions and implementations of practical medical information systems with examples in HIS, RIS and LIS

5. **Identify** the components, functions and implementations of PACS
6. **Explain** the standards used in medical informatics with practical examples
7. **Apply** basic network administration skills to design, implement and troubleshoot medical device and medical information systems in hospital networks
8. **Explain** the basic principles of cybersecurity with practical examples
9. **Explain** basic principles, applications and limitations of artificial intelligence in healthcare

Topics to be Covered:

		Duration in Weeks
1.	Electronic Health Records	1
2.	Hospital, Radiological, and Laboratory Information Systems	1
3.	Picture Archiving and Communication Systems (PACS)	1
4.	Telemedicine	1
5.	Medical Informatics Standards	1
6.	Basics of Networking	1
7.	Basics of Cybersecurity	2
8.	Artificial Intelligence in Medicine	1
9.	Applications	1

Student Outcomes addressed by the course: (Put a √ sign)

(1)	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	
(2)	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
(3)	An ability to communicate effectively with a range of audiences	
(4)	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	√
(5)	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
(6)	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
(7)	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	√

Key Student Outcomes assessed in the course: (4), (7)

Instructor or course coordinator: Prof. Yasser Mostafa Kadah
Last updated: December 2022.