BIRZEIT UNIVERSITY

Faculty of Engineering and Technology
Department of Computer Science

Course information:

A. **Course Code:** COMP3342
B. **Course Name:** Electronic Health Systems Interoperability and Integration
C. **Prerequisite:** COMP231/2310/2311, COMP2322 (but students can register with exception)
D. **Co-requisite:** None

Instructors Information:

A. **Name: Prof. Adel Taweel**
B. **Email:** ataweel@birzeit.edu
C. **Office hours**: See Ritaj

Course Description:

This course provides and covers the main theoretical and practical aspects of interoperability and integration in distributed systems with focus on health information systems techniques, approaches, mechanisms and relevant health data exchange standards. The course focuses on different interoperability approaches, methods and standards for data exchange in healthcare, using and applying relevant standards in healthcare, including HL7, CDA, IHE etc.

Course Goals:

The main goal of this course is to provide students with the applied knowledge and understanding of interoperability and integration approaches and methods focusing on their application and use in clinical data exchange between electronic health information systems.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

A. Knowledge and understanding

1. To understand the foundational concepts of System Integrations and Interoperability approaches in electronic health systems
2. To understand different interoperability levels and related standards for the integration, exchange and communication between electronic health systems.

B. Intellectual/Cognitive skills

1. Develop abilities to analyse different system integration and interoperability approaches and standards and how to critically evaluate, compare and contrast different system interoperability approaches and methods.

2. Be able to critically evaluate, assess and analyse considerations of healthcare contextual and circumstantial situations when, where and how to apply and use different interoperability standards for different health information systems integration situations or problems.

C. Subject specific and practical skills
1. Practice applying different health systems interoperability and integration approaches and standards on different integration problems.
2. To apply interoperability methods using communication server and tools on different health systems and data integration problems.

D. General and transferable skills
1. Develop abilities to work effectively within a multidisciplinary team and support various team functions to develop solutions.
2. Develop abilities to manage and present their own learning and work outputs.

Course Content:

Week #	Course Content	Assignments and Due Date
	Topic	
1, 2	Introduction to Integration and interoperability in healthcare Enterprise	
3, 4	Interoperability health terminology related standards	
5	Electronic Clinical Systems and Clinical Processes	
6	Patient Medical records models and elements	
7, 8	Clinical data exchange standards	
9	Integration in Healthcare Enterprise Standards	
10, 11, 12	Interoperability clinical message and document exchange standards	
13, 14	Interoperability Approaches and Exchange/Communication Servers	
15	Clinical Data Integrity and Consistency	

Teaching and learning method:

A. *Lecture:* Theoretical knowledge and practical aspects of the topic will be covered into a series of lectures that provide the foundational principles and concepts.
B. *Tutorial:* Understanding of integration and interoperability techniques, methods and standards will be improved through applied case studies, to critically analyse their strengths and weakness, in small group discussions.
C. *Project:* A case study within healthcare, to apply learned interoperability methods, and to analyse and develop and interoperability method and apply interoperability standards within developed healthcare scenarios.

Assessment methods based on outcomes:

1. Exams to asses A1, A2, B1, B2
2. Project to assess B1, B2, C1, C2, D1, D2
3. Assignments to assess A1, A2, B1, B2

Course Assessment in Normal situation (i.e., Final & Midterm exams are both conducted Face-to-Face**):**

Formative Assessment:

Assignments	15%
Mid Term Exam	25%
Group Project	30%

Summative assessment:

Final Exam	30%

Course Assessment in other abnormal situations:

Midterm Exam only Face-to-Face		**Midterm & Final exams NOT Face-to-Face**	
Mid Term Exam:	30%		
Assignment.	20%	Assignment.	30%
Group Project:	35%	Group Project	50%
In-class exercises:	15%	In-class exercises	20%

References:

A. Essential books /text books

1. Tim Benson, Grahame Grieve (2016). *Principles of Health Interoperability: SNOMED CT, HL7 and FHIR (Health Information Technology Standards)*, 3rd ed. 2016 Edition. ISBN: 9783319303680

B. Recommended books and Readings

1. Oemig, F., & Snelick, R. (2016). *Healthcare interoperability standards compliance handbook*. Cham, The Netherlands: Springer International Publishing. ISBN 978-3-319-44839-8.
2. Health Information and Quality Authority, *Overview of Healthcare Interoperability Standards*, https://www.hiqa.ie/sites/default/files/2017-01/Healthcare-Interoperability-Standards.pdf.
3. Bonnie F Fremgen and Suzanne S. Frucht, *Medical Terminology A Living Language*, Sixth edition, Pearson, 2016, ISBN-10: 0134070259/ ISBN-13: 978-0134070254.