Course syllabus
Biomedical Computing
BMT 485
4 credits (3L+1P)

Description

Biomedical computing course provides students a conceptual framework for understanding medical informatics and applications of information technology in the healthcare environment. The course will include in-depth discussion of how to use of technology in health care systems with emphasis on leveraging technology to improve quality and efficiency in care delivery. Moreover, the course provides an overview of the most important aspects of medical informatics that will impact the clinical research, education, health management and clinical services.

What is Biomedical Computing?

Biomedical Computing (Medical Informatics) studies the organization of medical information, the effective management of information using computer technology, and the impact of such technology on medical research, education, and patient care. The field explores techniques for assessing current information practices, determining the information needs of health care providers and patients, developing interventions using computer technology, and evaluating the impact of those interventions. This research seeks to optimize the use of information in order to improve the quality of health care, reduce cost, provide better education for providers and patients, and to conduct medical research more effectively.

Learning Outcomes

1. Explain biomedical computing and its role in health, health care, public health, medical education and biomedical research.
2. Compare and contrast the roles of various individuals in the health information technology workforce.
3. Define the major challenges to health information technology adoption in health care organizations
4. Describe and compare the best practice approaches to systems acquisition and system design.
5. Identity the essential functions of the electronic health record (EHR) and the barriers to its use.
6. Identify the components of the personal health record (PHR) and describe its value.
7. Explain the process of computerized provider order entry and challenges to its use.
8. Differentiate the difference among privacy, confidentiality, and security and their role in the HIPAA regulations.
9. Explain the importance of standards and interoperability of clinical data and the major initiatives underway to create and enable them.

10. Describe the management of images in clinical settings, including the use of PACS systems.
11. Classify the different types of telemedicine and their efficacy as shown in clinical studies.
12. Explain how people and organizational issues impact the use of health information technology and criteria for selecting the proper hospital information systems.
13. Explain the process of using Information technology in Patient monitoring to improve the health quality.

Time and Location
The course meets Tuesday from 10:00 to 2:00 pm at classroom No. 19. Practical meetings: TBA Instructor: Emad Amin,

Class plan
Most classes consist of didactic lecture. Interactivity from students is strongly encouraged. Practical includes experiments, programming skills and small project. Students are required to present a topic about the new trends in hospital information systems and recent applications in healthcare organizations.

Readings
Reading assignments consist of chapters from the required textbook as well as additional handouts. Students are responsible for learning **all** contents in lectures and the reading materials from the textbook.

The textbook for the class is
Edward H. Shortliffe, Leslie E. Perreault, (Eds.), *Medical Informatics: Computer Applications in Health Care and Biomedicine (3rd edition)*, Springer-Verlag, 2006. ISBN= 978-0-387-28986-1

Assignments
Short exercises will be assigned topics in most weeks, to be handed in the following week. Students should do their own work. Assignments include brief presenting of the next week's topic. Participation is essential to understanding course material and success in the course.

Examinations
One midterm test and final exam.

Course Projects/Presentations
Students are asked to develop a database for any department at a hospital. For instance, databases for pharmacy, clinical labs, radiology..etc. The goal of these projects is for students to explore information systems at hospitals and to learn important practical

issues related to hospital information system. Presentations should be related to course content.

Grading
Grades are derived from four components:
- ☐ Participation/ assignments (5 %)
- ☐ Presentations (15%)
- ☐ Midterm test (20%)
- ☐ Practical (20%)
- ☐ Final exam (40%)

Topics to be discussed:
This course is designed to introduce the fundamental principles of medical informatics. It is taught so that individuals with various backgrounds, including those with medical, computer science, or other backgrounds, can become familiar with information management and computer applications in health care. The following suggested topics would be covered:

Topics	No of Weeks	Contact hours
1. The computer meets the medicine: defining the discipline.	1	3
2. Medical data: their acquisition, storage, and use.	1	3
3. System design and engineering	1	3
4. Computer-based patient record system	2	6
5. Computer In Medical Education 1	1	3
6. Computer In Medical Education 2	1	3
7. Telemedicine	1	3
8. Imaging systems 1	1	3
9. Imaging systems 2	1	3
10. Patient-monitoring system	1	3
11. Standards in Health Informatics	1	3
12. Criteria for Selecting Health Information Systems	1	3
13. Future uses of Health Informatics and important Concepts	1	3

Instructor:

Nabil Alrajeh, Ph.D.
Assistant Professor of Medical Informatics
College of Applied Medical Sciences
King Saud University
nabilksu@yahoo.com
Tel. 4693661