

**TSCI 5076:
Introduction to Informatics**

Spring 2018

CLASS DAYS and TIME: Alternating Tuesdays, 9:00a.m.-11:00a.m.

CLASSROOM: TBD

COURSE DIRECTOR: Alfredo Tirado-Ramos

OFFICE LOCATION and HOURS: Cancer Center – Hours by appt.

EMAIL: tiradoramos@uthscsa.edu

TELEPHONE: (210) 919-9097

READ THIS DOCUMENT CAREFULLY – YOU ARE RESPONSIBLE FOR ITS CONTENTS

COURSE DESCRIPTION AND OBJECTIVES

This elective course is designed for students interested in information technologies in the context of clinical investigation. It offers an overview of the field of informatics applied to biomedicine, covering specific applications and general methods, issues, capabilities and limitations of informatics systems. Student teams will conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. The projects will include proposal writing, peer review, and preparing final reports, as well as guest lecturers from field experts.

Pre-requisites – None

Semester credit hours – 1 hour credit hours

By the end of this course, each student should be able to:

1. Discuss key issues for people and organizations in today's health informatics environment.
2. Explain how socio-technical factors can contribute to unintended consequences in the implementation and use of health informatics tools.
3. Discuss major topics at the intersection of health informatics and clinical workflow including interruptions, exceptions and workarounds
4. Make pragmatic decisions about the role of big data and widely discussed technologies in their project.
5. Acquire a basic knowledge of the Biomedical Informatics field, tie together the People and Organizations and Technology and Methodology modules into a wholistic view of the field.
6. Get a working knowledge of relevant standards used in biomedical informatics research.

COURSE ORGANIZATION

The main teaching modalities used in this course include:

Introduction (Tirado-Ramos)	The Nature of Informatics
People and Organizations (Lanham)	Introduction to People and Organization Issues in Informatics People and Organization Issues: Unintended Consequences of Health Informatics People and Organization Issues: Clinical Workflow and Learning Health Systems
Technology and Methodology (Tirado-Ramos)	Big Data and Biomedical Informatics Methods Interoperability Decision Support
Biomedical Informatics Applications (Tirado-Ramos)	Biomedical Informatics and Health IT Terminologies and Standards

Materials:

N/A

Computer Requirements:

Students are required to have a laptop computer that can connect to and operate over a wireless network.

Software required:

- Microsoft Office Suite (A personal copy of the latest version can be purchased at The UTHSCSA bookstore at student pricing with a student ID)

Laptops with an Apple based Operating System must be able to also operate using a Windows based Operating System. It may be necessary to purchase Windows (student pricing available at The UTHSCSA bookstore with a student ID) and virtualization software.

All laptops will connect to The UTHSCSA network via the HSCwave broadcast wireless connection. Authentication for wireless use is based on The UTHSCSA domain username and password.

Verification of proper operation **prior** to the start of class is highly recommended.

Assistance is available thru the IMS Service Desk

- Telephone:(567-7777)
- E-mail (ims-servicedesk@uthscsa.edu)

Assistance is also available at the IMS Student Support Center (ALTC 106).

Reading Assignments – Reading assignments will be listed in the individual class sections of this syllabus.

ATTENDANCE

Attendance at scheduled classes and examinations is crucial to meeting course objectives. Therefore, regular attendance in class is expected of each student.

- Attendance is defined as being present within 15 minutes after the scheduled beginning of the class and until 15 minutes before the scheduled ending of the class.
- Excused absences may be granted by the Course Director in cases such as formal presentations at scientific meetings, illness, or personal emergency.
- Excused absences are considered on an individual basis and require electronic communication with the Course Director to request an excused absence. The e-mail request to the Course Director for consideration of an excused absence must provide details regarding the circumstances and specific dates.
- It is expected that students will provide *advanced notice* of absence for scheduled events.
- If a student has excessive unexcused absences in a given course, they will automatically receive a grade of *unsatisfactory* unless *makeup* has been approved by the Course Director.
- Makeup of absences (both excused and unexcused) is allowed at the discretion of the Course Director.
- Allowable unexcused absences will be determined by the credit hours of the course as follows:

Course Semester Credit Hours	Allowable Unexcused Absences
3.0	3
2.0	2
1.0	1

TEXTBOOKS

Required:

- N/A

Grading System

The grading will be conducted on a pass fail basis and both assignments need a Satisfactory in order to pass the course.

S = Satisfactory U = Unsatisfactory

REQUESTS FOR ACCOMODATIONS FOR DISABILITIES

In accordance with policy 4.2.3, **Request for Accommodation Under the ADA and the ADA Amendments Act of 2008 (ADAAA)**, any student requesting accommodation must submit the appropriate request for accommodation under the American with Disabilities Act (ADA, form 100). To his/her appropriate Associate Dean of their School and a copy to the ADA Coordinator. Additional information may be obtained at <http://uthscsa.edu/eeo/request.asp>.

ACADEMIC INTEGRITY AND PROFESSIONALISM

Any student who commits an act of academic dishonesty is subject to discipline as prescribed by the UT System Rules and Regulations of the Board of Regents. Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an exam for another person, signing attendance sheets for another student, and any act designed to give unfair advantage to a student or the attempt to commit such an act. Additional information may be obtained at <http://catalog.uthscsa.edu/generalinformation/generalacademicpolicies/academicdishonestypolicy/>

TITLE IX AT UTHSCSA

Title IX Defined:

Title of the Education Amendments of 1972 is a federal law that prohibits sex discrimination in education. It reads “no person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.”

University of Texas Health Science Center San Antonio’s Commitment:

University of Texas Health Science Center San Antonio (UTHSCSA) is committed to maintaining a learning environment that is free from discriminatory conduct based on gender. As required by Title IX, UTHSCSA does not discriminate on the basis of sex in its education programs and activities, and it encourages any student, faculty, or staff member who thinks that he or she has been subjected to sex discrimination, sexual harassment (including sexual violence) or sexual misconduct to immediately report the incident to the Title IX Director.

In an emergency, victims of sexual abuse should call 911. For non-emergencies, they may contact UPD at 210-567-2800. Additional information may be obtained at <http://students.uthscsa.edu/titleix/>

EMAIL POLICY

All correspondence will be sent to the student using the student's LiveMail address and CANVAS. All correspondence from the student to the course director should be sent to the course director's e-mail as listed on the first page of this syllabus.

USE OF RECORDING DEVICES

Only with course director's or instructor's permission.

ELECTRONIC DEVICES

Cell phones must be turned off during all class meetings and exams. Computers and electronic tablets are allowed only for participating in classroom activities (*e.g.*, viewing slides presented in lecture or conference materials). No texting, tweeting, e-mailing, web-surfing, gaming, or any use of electronic devices that is not directly connected with classroom activities is permitted.

TENTATIVE CLASS SCHEDULE

**TSCI 5076
 Introduction to Informatics
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Week	Date	Module	Title/Instructor(s)
1		The Nature of Informatics	
2		Introduction to People and Organization Issues in Informatics	
3		People and Organization Issues: Unintended Consequences of Health Informatics	
4		People and Organization Issues: Clinical Workflow and Learning Health Systems	
5		Big Data and Biomedical Informatics Methods	
6		Interoperability	
7		Decision Support	
8		Biomedical Informatics and Health IT	
9		Terminologies and Standards	

Week: 1

Date: (9:00-11:00 a.m.)

Room: ALTC 2.212

Instructor(s): Alfredo Tirado-Ramos, Holly J. Lanham, Alex F. Bokov

Topic: The Nature of Informatics

Learning Objectives and Competencies– Participants will be able to:

1. Understand structure and expectations of the course; introductions
2. Summarize the three domains of biomedical informatics
3. Articulate what goals you might wish to achieve using biomedical informatics
4. Share any relevant research projects and experiences with the class

Class Assignment:

Readings:

Week: 2
Date: (9:00-11:00 a.m.)
Room: ALTC 2.212
Instructor(s): Holly J. Lanham
Topic: Introduction to People and Organization Issues in Informatics
Learning Objectives and Competencies– Participants will be able to:
<ol style="list-style-type: none"> 1. Understand the key issues for people and organizations in today’s health informatics environment 2. Discuss the intentions of the HITECH legislation and Meaningful Use and the regulatory requirements behind it
Class Assignment: Read assigned material and be prepared to discuss.
Readings: Sittig, Dean F. , Singh, H. A new sociotechnical model for studying health information technology in complex adaptive healthcare systems <i>Qual Saf Health Care</i> 2010;19:i68-i74 doi:10.1136/qshc.2010.042085

Week: 3
Date: (9:00-11:00 a.m.)
Topic: People and Organization Issues, Unintended Consequences of Health Informatics
Room: ALTC 2.212
Instructor: Holly J. Lanham
Learning Objectives and Competencies – Participants will be able to:
<ol style="list-style-type: none"> 1. Discuss the different types of errors and unintended consequences that can be introduced with the implementation of health informatics tools. 2. Explain some of the socio-technical factors that cause unintended consequences associated with the implementation of health informatics tools. 3. Think about ways to mitigate some of these unintended consequences via design principles and management of health informatics tools
Class Assignment: Read assigned material and be prepared to discuss.
Readings and Bibliography:
<ol style="list-style-type: none"> 1. Ash JS, Berg M, Coiera E. "Some unintended consequences of information technology in health care: the nature of patient care information system-related errors." <i>Journal of the American Medical Informatics Association</i> 11.2 (2004): 104-112. 2. Koppel R et al. "Role of computerized physician order entry systems in facilitating medication errors." <i>JAMA</i> 293.10 (2005): 1197-1203.

Week: 4
Date: (9:00-11:00 a.m.)
Topic: People and Organization Issues, Clinical Workflow, Decision Making, and Learning Health Systems
Room: ALTC 2.212
Instructor: Holly J. Lanham
Learning Objectives and Competencies – Participants will be able to:
<ol style="list-style-type: none"> 1. Discuss major topics at the intersection of health informatics and clinical workflow including interruptions, exceptions and workarounds 2. Understand basic implications of health informatics on clinical decision making 3. Explain the main objectives and design tenets of a Learning Health System
Class Assignment: Read assigned material and be prepared to discuss.

Readings and Bibliography:

1. Zheng, Kai, et al. "Quantifying the impact of health IT implementations on clinical workflow: a new methodological perspective." *Journal of the American Medical Informatics Association* 17.4 (2010): 454-461.
2. Friedman, Charles, et al. "Toward a science of learning systems: a research agenda for the high-functioning Learning Health System." *Journal of the American Medical Informatics Association* (2014): amiajnl-2014.
3. [Optional] Weick, Karl E. "Cosmos vs. chaos: Sense and nonsense in electronic contexts." *Organizational Dynamics* 14.2 (1985): 51-64.

Week: 5
Date: (9:00-11:00 a.m.)
Room: ALTC 2.212
Topic: Interoperability
Instructor: Alfredo Tirado-Ramos
Learning Objectives and Competencies – Participants will be able to:
1. Understand the principles of Biomedical Data Interoperability
Class Assignment: TBA
Readings and Bibliography: TBA

Week: 6
Date: (9:00-11:00 a.m.)
Room: ALTC 2.212
Instructor: Alfredo Tirado-Ramos
Topic: Decision Support
Learning Objectives and Competencies – Participants will be able to:
1. Understand and implement basic decision support systems
Class Assignment: TBA
Readings and Bibliography: TBA

Week: 7
Date: April 04, 2017 (9:00-11:00 a.m.)
Room: ALTC 2.212
Topic: Big Data Methods
Instructor: Alfredo Tirado-Ramos
Learning Objectives and Competencies – Participants will be able to:
1. Define basic big data concepts like cloud computing, map-reduce, and Hadoop
2. Critically evaluate when investment in big data infrastructure is actually justified.
3. Distinguish when big data is an IT concern and when it becomes a scientific concern.
Class Assignment: TBA
Readings and Bibliography: Handouts

Week: 8
Date: (9:00-11:00 a.m.)
Room: ALTC 2.212
Topic: Biomedical Informatics and Health IT
Instructor: Alfredo Tirado-Ramos
Learning Objectives and Competencies – Participants will be able to: <ol style="list-style-type: none">1. Diagram the relationships between the major components of healthcare IT infrastructure and give examples.2. Summarize the main methods for storing data.3. Summarize the commonly encountered data-sources in biomedical informatics, how they are accessed, and what domain or domains each belongs to.4. List common obstacles to making effective use of biomedical data, particularly as it relates to your own goals
Class Assignment: Read assigned material and be prepared to discuss
Readings and Bibliography: Suggested literature and handouts from Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition (Paperback) by Ian H. Witten, Eibe Frank. (Morgan Kaufmann Series in Data Management Systems 2005)

Week: 9
Date: (9:00-11:00 a.m.)
Room: ALTC 2.212
Topic: Terminologies and Standards
Instructor: Alfredo Tirado-Ramos
Learning Objectives and Competencies – participants will be able to: <ol style="list-style-type: none">1. Know the major diagnostic coding systems and where to look up the respective codes.2. Know the major procedural coding systems and where to look up the respective codes.3. Know the major pharmaceutical coding systems and where to look up the respective codes.4. Understand how commonly used EMR systems store vital measurements and other data that don't fit into the above coding schemes5. Know what HL7 is and what problem it's intended to solve
Class Assignment: Read assigned material and be prepared to discuss.
Readings and Bibliography: Suggested literature and handouts from Standards in medical informatics, WE Hammond, JJ Cimino - Medical informatics, 2001 - Springer.