

BioMedical Informatics

A Course For Health Professionals



Marine Biological Laboratory - National Library of Medicine



schedule »

Overview

Schedule

Faculty

Logistics

Application

Archives

Other MBL Courses

What Is Medical Informatics?

J. Cimino Objectives

- To provide open discussion among the participants on the definitions and scope of medical informatics
- To identify the component disciplines within the field of biomedical informatics
- To introduce a clinical case summary that will be used throughout the course to show how theoretical and practical aspects of informatics relate to health care

At the conclusion of the session, participants should:

- Have a basic understanding of the components of medical informatics
- Be able to characterize these components as technologies, concepts and skills

Outline

- I. What is Medical Informatics - An open discussion
- II. Component Disciplines
- III. Concepts, Technologies and Skills
- IV. External Forces
- V. Case Presentation
- VI. Course Overview

Current Issues in Medical Informatics

A. McCray Objectives

Outline

Bioinformatics

J. Mitchell Objectives

Outline

Principles of Controlled Vocabulary I

J. Cimino Objectives

- Describe terminology concepts and characteristics
- Provide examples of coding clinical data
- Examine the state of the art with respect to current standards
- Examine case studies of use and reuse of coded data

At the conclusion of the session, participants should:

- Understand the motivation for coding clinical data
- Understand the "desiderata" for high-quality controlled terminologies
- Be familiar with currently available terminologies

Outline

This pair of lectures is organized into six "threads" that will be woven together



concurrently:

- I. Clinical case
- II. Use and reuse of data
- III. Coding clinical data
- IV. Available terminologies
- V. Terminology concepts and desiderata
- VI. Practical considerations

Personal Web Pages

C. Dematos

Objectives

Outline

Decision Support

T. Shortliffe

Objectives

Outline

Human-computer Interface

J. Starren

Objectives

Outline

Digital Library Principles

Alexa T. McCray, Ph.D.

Objectives

Outline

Principles of Database Design

J. Cimino

Objectives

- Define "database"
- Review the history of database architectures
- Teach the principles of database normalization
- Identify the basics for object-oriented database design
- Reinforce principles with a design exercise.

At the conclusion of the session, participants should:

- Understand the evolution of modern database architecture
- Understand some of the principles behind choices to be made when designing a database
- Have a basic understanding of database normalization

Outline

- I. Definition
- II. History of Database Architectures
- III. Database Normalization
- IV. Object-Oriented Table Design
- V. Exercise: Database for Medline Records
- VI. Exercise: Clinical Database

Consumer Health Informatics

A. McCray

Objectives

Outline

Public Health Informatics

R. Kukafka

Objectives

Outline

PubMed & the NLM Gateway

A. Nahin

Objectives

Session Outline

Introduction to Personal Databases

D. Remsen

Objectives

Outline

Why Informatics? Case Presentation and Overview of Decision Support

R. Miller

- Presentation & Discussion of Clinical Case
- Types of decision-making in clinical setting:
 1. Diagnosis
 - Elicitation of "findings"
 - Hypothesis generation
 - Test-or-treat / threshold for treatment
 - Differential Diagnosis & its refinement
 - Establishing a diagnosis
 - Repeating process for multiple diagnoses
 2. Prognosis
 3. Therapy
 - Empirical
 - Evidence-based
 4. Observation & Alteration of Plan
- Rationale for computer-assisted decision support (with references)
- Insight into clinical decision-making
 1. Elstein et al: early hypothesis generation
 2. Eddy & Clanton: role of pivotal finding
 3. Kassirer et al: refinement of hypotheses
 4. Simon et al: Chess & expert vs. novice (compiled knowledge)
 5. Studies of clinical information needs: Covell, Osheroff, Timpka, et al
- Previous approaches to diagnostic decision support
 - o Branching logic
 - o Simple Bayesian

- o Rule-based
- o Criterion-based
- o Mathematical models, e.g., clustering, set-covering
- o Heuristic
- o Bayesian belief networks
- o Neural networks
- Requirements for decision-making in clinical setting:
 1. Source of clinical expertise: human vs. other
 2. Knowledge base with ongoing maintenance
 3. Separation of KB and algorithms
 4. Methods for feedback to improve system
 5. User interface
 6. Integration into workflow
- Discussion of impediments related to 1-6 above

Institutional Perspective: Setting an Enterprise Target

W. Stead Objectives

This lecture explores how to align enterprise and information technology strategies.

Educational Objectives:

- Learn four questions to ask to align enterprise and IT strategies
- Appreciate that IT can provide value to an enterprise in many ways, each with distinct costs and benefits
- Recognize trends in technology and informatics that are changing the art of the possible
- Appreciate the discontinuous nature of change in work process required to benefit from IT

Outline

1. Framework to guide thinking about alignment of enterprise and IT strategies.
2. Picking the purpose of IT in your business
3. Key trends in IT and informatics
4. One vision of how ready access to information might change health care in the near term
5. Status check

Change: Overview and What it Takes to Be a Change Agent

N. Lorenzi Objectives

1. An overview of transformational Change
2. Implementing Change-Strategies for Making it Work and Your Role

Outline

Vendor and Enterprise Roles

W. Stead Objectives

This lecture explores how to implement information technology infrastructure to provide ready access to information in clinical workflow.

- Appreciate that the fragmented nature of the health care information

- technology industry is a barrier to optimal clinical information access
- Appreciate how an architectural strategy of managing information separately from information systems might overcome the problems caused by this fragmentation.
 - Distinguish between what may be purchased from a vendor and what must be provided by the enterprise

Outline

1. Health care information technology industry profile
2. An architectural approach to managing information as a corporate asset
3. Enterprise-vendor responsibilities
4. Case studies of system integration.

A Developer's View of Clinical Informatics: Vanderbilt WizOrder and NICU Implementation Process as an Example

R. Miller

Objectives

Outline

Building Web Interfaces to Databases

D. Remsen

Objectives

Outline

Putting Change into Practice - the Vanderbilt E3 and E5 Projects

N. Lorenzi

Objectives

1. To present the change process in a major informatics effort. (E3)
2. To describe a tool/process to select appropriate sites for pilot efforts. (E5)

Outline

The Internet: Reflections on What's Coming

Lawrence C. Kingsland, III, Ph.D.

Objectives

Session Outline

Evaluation

C. Friedman

Objectives

Outline

Telemedicine

T. Nesbitt

Objectives

Outline