**Lectures outlines**

1. **Introduction to medical informatics:**

* Definitions of health informatics, clinical informatics and bioinformatics.
* What is health informatics focus on?
* History of medical informatics
* The rise of health informatics.
* The nature of medical informatics
* Relationship to biomedical science and medical practice
* Relationship to computer science
* Relationship to biomedical engineering
* Integrating medical computing and medical practice.

**Reference:**

* **Coiera, Enrico (2003), Guide to Health Informatics.**
* **Shortliffe, Perreualt, wiederhold, Fagan & Fagan (eds).Medical Informatics: Computer applications in healthcare and biomedicine.2nd edition.2003. Springer.ISBN:0387984720.**

1. **Computer-based patient Records: + T**

* **What is a computer – based patient records?**
  + Purposes of patient record.
  + Ways in which a computer- based patient record differs from a paper-based record.
* **Functional components of computer – based patient record system** 
  + Integrated view of patient data
  + Clinical decision support
  + Clinician order entry
  + Access to knowledge recourse
  + Integrated communication support.
* **Fundamental issues for computer-based patient record system** 
  + Data entry.
  + Data display.
* **Challenges ahead**
* User information needs
* User interfaces
* Standards
* Legal and social issues
* Costs and benefits
* Leaderships

**Reference: Shortliffe, Perreualt, wiederhold, Fagan & Fagan (eds).Medical Informatics: Computer applications in healthcare and biomedicine.2nd edition.2003. Springer.ISBN:0387984720.**

1. **Coding and classification systems**

* Language establishes a common ground
* Terms, codes, groups and hierarchies.
* The international classification of disease
* Diagnosis related group
* Systemized Nomenoclature of Medicine (SNOMMED)
* The unified medical language system (UMLS)

**Reference:**

* **Coiera, Enrico (2003), Guide to Health Informatics**
* **Shortliffe, Perreualt, wiederhold, Fagan & Fagan (eds).Medical Informatics: Computer applications in healthcare and biomedicine.2nd edition.2003. Springer.ISBN:0387984720.**

1. **Clinical Decision Support systems:**

* **The nature of clinical decision –making**
* Types of decisions
* The role of computers in decision support
* **A structure for characterizing clinical decision- support systems**
* System function
* The mode for giving advice
* Style of communication
* Underlying decision- making process
* Human-computer interaction
* **Construction of decision- support tools**
* Acquisition and validation of patient data
* Modeling of medical knowledge
* Elicitation of medical knowledge
* Representation and reasoning about medical knowledge
* Validation of system performance
* Integration of decision- support tools
* **Illustrative examples of clinical decision- support system**
* Diagnosis: the internist-1/QMR project
* Patient management :the EON system

**Reference: Shortliffe, Perreualt, wiederhold, Fagan & Fagan (eds).Medical Informatics: Computer applications in healthcare and biomedicine.2nd edition.2003. Springer.ISBN:0387984720.**

1. **Hospital information systems: +T**

* **Introduction**
  + Definition of hospital information system (HIS)
  + Conditions which required to successfully implement HIS
* **Analysis of information system** 
  + The various level of information system
  + The environment of information system
  + HIS objectives
  + Structural analysis
  + Functional analysis
  + Behavioral analysis
* **The components of HIS** 
  + Administration
  + Health- care units
  + Ancillary services
* **Strategies and technical solutions** 
  + The vertical approach: centralized HIS
  + The horizontal approach: departmental systems
  + The distributed approach: distributed and open systems
* **Required resources** 
  + Allocating resources and estimating cost.
  + Human resources.

**Reference: Degoulet P, Fieschi M. Introduction to Clinical Informatics.1st edition.1996. Springer. ISBN: 0387946411.**

1. **Imagine systems: +T**

* **Imaging and imaging informatics**
* Roles for imaging in health care
* The radiologic process and its interaction
* Imaging informatics: basis for a subdiscipline
* **Image generation**
* Basic concepts in image generation
* **Image management**
* Basic concepts in image management
* The evolution of image management in Picture-Archiving and Communication System (PACS).
* **Image manipulation**
* Basic concepts in Image manipulation
* **Integration of images with other healthcare information**
* Basic concepts in integration of radiology information
* Radiology information system

**Reference: Shortliffe, Perreualt, wiederhold, Fagan & Fagan (eds).Medical Informatics: Computer applications in healthcare and biomedicine.2nd edition.2003. Springer.ISBN:0387984720.**

1. **Medical data and database:**

* **What are medical data?**
* What are the types of medical data?
* Who collects the data?
* **Uses of medical data**
* Create the basis for historical record
* Support communication among providers
* Anticipate future health problems
* Record standard preventive measures
* Identify deviations from expected trends
* Provide a legal record
* Support clinical research
* **The structure of medical data**
* Coding systems
* The data-to-knowledge spectrum
* **Query and surveillance** **systems**
* Clinical care
* Clinical research
* Retrospective studies
* Administration
* **Data mining**
* What motivated data mining ?why is it important
* What is data mining?

**Reference:**

* **Shortliffe, Perreualt, wiederhold, Fagan & Fagan (eds).Medical Informatics: Computer applications in healthcare and biomedicine.2nd edition.2003. Springer.ISBN:0387984720.**
* **Degoulet P, Fieschi M. Introduction to Clinical Informatics.1st edition.1996. Springer. ISBN: 0387946411.**
* **Micheline Kamber‏. Jiawei Han‏. Data mining: concepts and techniques**

1. **Ethical, legal, and Social Issues in Biomedical Informatics:**

* **Ethical Issues in Health Informatics:**
* **Ethics Resources**
* **General Principles of Informatics Ethics**
* **Stakeholders in Health Informatics Ethics**
* **Primary sources of ethical attention in informatics**
* **Health informatics applications:**
* Appropriate use, users, and contexts
* Privacy, confidentiality, and data sharing
* Electronic clinical and research data
* **Legal and regulatory matters**
* **Legal issues in Healthcare Informatics**
* Liability under Tort Law
* Computer Programs as Potential Expert Witnesses
* Privacy and Confidentiality
* Copyrights, Patents, and Intellectual Property
* **Health Insurance Portability and Accountability Act (HIPAA)**

**References:**

* **Shortliffe, Perreualt, wiederhold, Fagan & Fagan (eds).Medical Informatics: Computer applications in healthcare and biomedicine.2nd edition. Springer. 2003.**
* **The IMIA Code of Ethics for Health Information Professionals.**
* **Samuel H, Zaïane O, Sobsey D. Towards a Definition of Health Informatics Ethics. 1st ACM International Health Informatics Symposium, IHI '10, November 11–12, 2010, Arlington, Virginia, USA.**
* **Val Verde Regional Medical Center. Health Insurance Portability and Accountability Act (HIPAA). [Online].2010[cited 2010 Nov 28];Available from: URL:**[**http://www.vvrmc.org/hipaa.html**](http://www.vvrmc.org/hipaa.html)
* **Health Insurance Portability And Accountability Act. Hippa – Health Insurance Portability And Accountability Act. [Online].2010 July 27[cited 2010 Nov 28];Available from: URL:** [**http://www.hipaagives.org/articles/hippa-health-insurance-portability-and-accountability-act/**](http://www.hipaagives.org/articles/hippa-health-insurance-portability-and-accountability-act/)
* **What is HIPPA?. [Online].2009 [cited 2010 Nov 28];Available from: URL:** [**http://whatishipaa.org/**](http://whatishipaa.org/)

1. **Evidence based medicine (EBM):**

* **Evidence based medicine definition.**
* **History of EBM.**
* **Realizations which lead to rapid spread of EBM.**
* **Importance of EBM.**
* **Steps of EBM.**
* Converting the need for information into an answerable question.
* Tracking down the best evidence with which to answer that question.
* Critically appraising that evidence.
* Integrating the critical appraisal with clinical expertise and with patient unique biology, values and circumstances.
* Evaluating effectiveness and efficiency in executing steps1-4 and seeking ways to improve them for next time.
* **Learning more about EBM.**

**References:**

* + - **Sackett DL, Straus S, Richardson W, Rosenberg W, Haynes R. Evidence Based Medicine how to practice and teach EBM.UK:Churchill Livingstone;2000.**
    - **Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ. 1996; 312:71–72.**
    - **Ellrodt G,  Cook D,  Lee J,  Cho M,  Hunt D, Weingarten S. Evidence-Based Disease Management JAMA. 1997; 278(20):1687-1692.**
    - **Friedland D,  Davoren J, Go A, Shlipak M, Bent S, Subak L, Mendelson T. Evidence-Based Medicine: A Framework for Clinical Practice. United State of America: McGraw-Hill Companies; 1998.**
    - **Lewis S, Orland B. The Importance and Impact of Evidence-Based Medicine. JMCP Sep 2004; 10(5):S3-S29.**
    - **Center of evidence based medicine [Online]. 2009 April 07 [cited 2010 Nov 14];Available from: URL:** [**http://www.cebm.net/index.aspx?o=1036**](http://www.cebm.net/index.aspx?o=1036)

1. **Standards in medical informatics**

* **The idea of standards.**
* **The need for health informatics standards**
* **Standards undertakings and organization**
  + The standards development process
  + Information-standards organizations :
    - American National Standards Institute
    - CEN Technical Committee 251
    - ISO Technical Committee 215
    - American Society for Testing and Materials
    - Healthcare Informatics Standards Board
    - Computer-Based Patient Record Institute
* Health Insurance Portability and Accountability Act
* **Coded terminologies, vocabularies, and nomenclatures**
* **Data interchange standards**
* General concepts and requirements

**Reference: Shortliffe, Perreualt, wiederhold, Fagan & Fagan (eds).Medical Informatics: Computer applications in healthcare and biomedicine.2nd edition.2003. Springer.ISBN:0387984720.**

1. **Medical searching**

* **Successful searching for knowledge requires well-structure questions to be asked of well informed agent**
* **Search strategies are optimized to minimize cost and maximize benefits**
* **The set of all possible options forms a search space**
* **Search strategies are designed to find the answer in the fewest possible steps**
* Database search terms are used to create a working document

search space

* **The answer is evaluated to see if it is well formed, specific, accurate and reliable**

**Reference: Coiera, Enrico (2003), Guide to Health Informatics**