

Component 1: Introduction to Healthcare and Public Health in the US

Components are a collection of curriculum materials pertinent to a specific set of concepts broken down into units. A unit is further broken down into objectives. Selection can be either of components, units or objectives.

Component 1/Unit 1: Introduction and History of Modern Healthcare in the US

This introductory unit covers definitions of terms used in the component, with an emphasis on paradigm shifts in healthcare, including the transition from physician-centric to patient-centric care, the transition from individual care to interdisciplinary team-based care, and the central role of technology in healthcare delivery. This unit also emphasizes the core values in US healthcare.

Unit Objectives: By the end of this unit the student will be able to:

1. Delineate key definitions in the healthcare domain.
2. Explore components of healthcare delivery and healthcare systems.
3. Define public health and review examples of improvements in public health.
4. Discuss core values and paradigm shifts in US healthcare.
5. Describe in overview terms, the technology used in the delivery and administration of healthcare.

Component 1/Unit 2: Delivering Healthcare (Part 1)

This unit depicts the medical model of healthcare in the US, with an overview of the organization of healthcare and the physical structure of healthcare delivery in the outpatient, inpatient and long-term care settings, including an overview of the organization of the Veterans Affairs (VA) system. This unit is intended primarily for the student who does not have a background in healthcare, though the topics of this unit will be described at a relatively advanced level.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the organization of healthcare at the federal, state and local levels.
2. Describe the organization of the VA system and Military Health System.
3. Describe the structure and function of hospital clinical and administrative units.
4. Describe different types of long term care facilities, with an emphasis on their function.

Component 1/Unit 3: Delivering Healthcare (Part 2)

This unit depicts the medical model of healthcare in the US, with an overview of the organization of healthcare and the physical structure of healthcare delivery in the outpatient setting, including an overview of the people involved in the delivery of healthcare, their education and licensing. This unit is intended primarily for the student who does not have a background in healthcare, though the topics of this unit will be described at a relatively advanced level.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the organization of clinical healthcare delivery in the outpatient setting, and the organization of outpatient healthcare.

2. Describe the organization of ancillary healthcare delivery in the outpatient setting.
3. Discuss the role of different healthcare providers, with an emphasis on the delivery of care in an interdisciplinary setting.

Component 1/Unit 4: Financing Healthcare (Part 1)

This unit provides an overview of the role of healthcare in the economy and a description of various models of healthcare financing. The unit provides a history of the current US system and laws that have influenced its development. It also includes discussion of healthcare financing at the governmental, enterprise, and consumer levels.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the importance of the healthcare industry in the US economy and the role of financial management in healthcare.
2. Describe models of health care financing in the US and in selected other countries.
3. Describe the history and role of the health insurance industry in financing healthcare in the United States, and Federal laws that have influenced the development of the industry.
4. Understand the differences among various types of private health insurance and describe the organization and structure of network-based managed care health insurance programs.
5. Understand the various roles played by government as policy maker, payer, provider, and regulator of healthcare.
6. Describe the organization and function of Medicare and Medicaid.
4. Understand the differences among various types of private health insurance and describe the organization and structure of network-based managed care health insurance programs.
5. Understand the various roles played by government as policy maker, payer, provider, and regulator of healthcare.
6. Describe the organization and function of Medicare and Medicaid.

Component 1/Unit 5: Financing Healthcare (Part 2)

This unit continues the discussion of healthcare financing at the governmental, organizational, and consumer levels. It describes the revenue cycle for healthcare organizations, identifies the different reimbursement methodologies and standards developed for the billing (reimbursement) process. Finally, this unit reviews some of the factors responsible for the escalating healthcare expenditures in the US and discusses some methods for controlling rising medical costs.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the revenue cycle and the billing process undertaken by different healthcare enterprises.
2. Understand the billing and coding processes, and standard code sets used in the claims process.
3. Identify different fee-for-service and episode-of-care reimbursement methodologies used by insurers and healthcare organizations in the claims process.
4. Review factors responsible for escalating healthcare expenditures in the United States.
5. Discuss methods of controlling rising medical costs.

Component 1/Unit 6: Regulating Healthcare

This unit provides an overview of the regulation of healthcare, including regulatory and professional organizations, the regulation of safety in medicine, and key legal aspects of medicine. This unit also covers compliance issues including privacy violations, reimbursement and fraud and abuse.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the role of accreditation, regulatory bodies, and professional associations in healthcare in the US.
2. Describe the basic concepts of law in the United States: the legal system, sources of law, classification of laws, the court system, and the trial process.
3. Describe legal aspects of medicine involving the Affordable Care Act, professional standards in healthcare, medical malpractice, Tort reform, and Medicare and Medicaid Fraud and Abuse.
4. Describe key components of the Health Insurance Portability and Accountability Act (HIPAA) and current issues of privacy and patient safety in the US.
5. Discuss the need for quality clinical documentation for the use of the health record as a legal document, communication tool and a key to prove compliance for healthcare organizations.

Component 1/Unit 7: Public Health (Part 1)

This unit provides a discussion of public health origins and history, the differentiation from private health, and the significant value provided by public health. It also reviews important terminology and includes an examination of the general organization of public health agencies and the flow of data within public health.

Unit Objectives: By the end of this unit the student will be able to:

1. Discern the main differences and similarities between public and private health.
2. Delineate the historic timeline and achievements of public health in the US.
3. Define and discuss key terminology of public health.
4. Illustrate the general organization of public health agencies and public health data flow.
5. Evaluate and explain the impact and value of public health.

Component 1/Unit 8: Public Health (Part 2)

This unit provides an overview of public health topics including: important communicable diseases and public health responses; terrorism, including biological, agricultural, and chemical terrorism; and chronic diseases and environmental health.

Unit Objectives: By the end of this unit the student will be able to:

1. Give examples of and explain the general program categories of public health, including communicable disease, chronic disease, terrorism response, and environmental public health.
2. Discuss the activities and achievements of public health in the realm of communicable disease.
3. Compare and contrast the different types of terrorism and the different public health responses.
4. Describe chronic disease activities and achievements of public health, and the work of public health in the realm of environmental health hazards.

Component 1/Unit 9: Healthcare Reform

This unit provides an overview of healthcare trends including evidence based medicine, quality and practice-care recommendations, comparative effectiveness research, and an overview of healthcare reform initiatives in the US.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe evidence-based medicine, clinical practice guidelines, and quality indicators in medicine.
2. Describe the patient-centered medical home model.
3. Discuss the key issues driving healthcare reform in the US.

Component 1/Unit 10: Meaningful Use of Health Information Technology

The Health Information Technology for Economic and Clinical Health (HITECH) Act of the American Recovery and Reinvestment Act (ARRA) legislated incentives for the meaningful use of health information technology. This unit describes the meaningful use program of HITECH, eligibility for incentive payments, and the criteria for achieving those payments in Stage 1 of the program. It also describes the standards specified for Stage 1 of meaningful use, including those devoted to privacy and security.

Unit Objectives: By the end of this unit the student will be able to:

1. Define meaningful use of health information technology in the context of the Health Information Technology for Economic and Clinical Health (HITECH) Act.
2. Describe the major goals of meaningful use.
3. Define the criteria for Stage 1 of meaningful use for eligible professionals and eligible hospitals.
4. Describe the standards specified for Stage 1 of meaningful use, including those devoted to privacy and security.
5. Discuss the likely criteria for Stages 2-3 of meaningful use.

Component 2: The Culture of Healthcare

Components are a collection of curriculum materials pertinent to a specific set of concepts broken down into units. A unit is further broken down into objectives. Selection can be either of components, units or objectives.

Component 2/Unit 1: An Overview of the Culture of Healthcare

This introductory unit discusses some of the underlying concepts of health, culture, and how health informatics applications can be used to study culture.

Unit Objectives: By the end of this unit the student will be able to:

1. Distinguish between disease and illness.
2. Discuss the relationship between health and the healthcare system.
3. Define 'culture' in the classic sense, as well as in the modern sense of the term, and what it means for culture to be partial, plural, and relative.
4. Explain the concept of 'cultural competence'.
5. Explain the concepts and distinguish between 'culture', 'cultural safety', and 'safety culture', as applied to organizations.
6. Be aware of the multiple cultures that interact in healthcare delivery.

7. Define 'acculturation' and how it relates to working in healthcare settings.
8. Be able to give examples of health informatics applications of the study of culture.

Component 2/Unit 2: Health Professionals – the People in Healthcare

This unit discusses the health professionals who deliver healthcare and the training needed to work in these professions. The following professionals are described in this unit: physicians, nurses, advanced practice nurses, physician assistants, pharmacists, therapists, allied health professionals, paramedics, EMTs, dental professionals, mental health professionals, and social workers.

Unit Objectives: By the end of this unit the student will be able to:

1. Define terms used in healthcare including clinician, patient, disease, and syndrome and in health professionals' education and training.
2. Describe the education, training, certification, licensure and roles of physicians including those in primary care and other specialties.
3. Describe the education, training, certification, licensure and roles of nurses, advanced practice nurses, LPNs, MA's and Medication Aids.
4. Describe the education, training, certification, licensure and roles of physician assistants, pharmacists, therapists, allied health professionals.
5. Describe the education, training, certification, licensure and roles of paramedics, EMTs, dental professionals, mental health professionals, and social workers.

Component 2/Unit 3: Healthcare Settings – The Places Where Care is Delivered

This unit describes healthcare delivery sites including outpatient care, hospitals, tertiary care centers, academic medical centers, the VA healthcare system, the military health system, the Indian health service, and non-traditional delivery sites such as school-based, community-based, and employer-based sites. It also specifically examines the structure, function and interrelationship between healthcare settings.

Unit Objectives: By the end of this unit the student will be able to:

1. Differentiate the range of care delivery organizations, including primary care, specialty care, tertiary care, inpatient and outpatient facilities, long-term care hospitals, and long-term care facilities.
2. Analyze the organization of healthcare delivery from the perspective of a "continuum of care," such as ambulatory services, in-patient care, long-term care, and end-of-life care.
3. Evaluate the similarities and differences of community hospitals, teaching hospitals, and community health clinics.
4. Describe the various departments and services offered by an outpatient clinic, community hospital, academic medical center, and long-term care facility.
5. Explain the ways in which these departments interact and the services relate.
6. Speculate on the data and information that are created and used by people in these departments.
7. Describe ways in which medical and/or information technology has improved interdepartmental communication and how that has improved the patient experience.

Component 2/Unit 4: Healthcare Processes and Decision Making

This unit describes the process used by a clinician to make a diagnosis and determine a care plan. This includes gathering information from the patient as well as other objective and subjective sources, managing and organizing the information, comparing the information to known states of disease, and developing a care plan for the patient.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the elements of the 'classic paradigm' of the clinical process.
2. List the types of information used by clinicians when they care for patients.
3. Describe the steps required to manage information during the patient-clinician interaction.
4. List the different information structures or formats used to organize clinical information.
5. Explain what is meant by the 'hypothetico-deductive' reasoning process.
6. Explain the difference between observations, findings, syndromes, and diseases.
7. Describe techniques or approaches used by clinicians to reach a diagnosis.
8. List the major types of factors that clinicians consider when devising a management plan for a patient's condition, in addition to the diagnosis and recommended treatment.

Component 2/Unit 5: Evidence-Based Practice

This unit describes the application of evidence-based medicine (EBM). The discussion begins with the framing of clinical questions that can be answered by appropriate evidence. It then demonstrates how to find and apply the best evidence for answering four major types of clinical questions: interventions, diagnosis, harm, and prognosis. The unit also introduces summarizing of evidence (systematic reviews) as well as clinical practice guidelines and concludes with a discussion of the limitations of EBM.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the key tenets of evidence-based medicine (EBM) and its role in the culture of healthcare.
2. Construct answerable clinical questions and critically appraise evidence answering them.
3. Apply EBM for intervention studies, including the phrasing of answerable questions, finding evidence to answer them, and applying them to given clinical situations.
4. Understand EBM applied to the other key clinical questions of diagnosis, harm, and prognosis.
5. Discuss the benefits and limitations to summarizing evidence.
6. Describe how to implement EBM in clinical settings through clinical practice guidelines and decision analysis.

Component 2/Unit 6: Nursing Care Processes

This unit describes the processes used by a nurse in making clinical decisions and assessing patients. It also describes how nurses are trained, where they work and the procedures that they perform.

Unit Objectives: By the end of this unit the student will be able to:

1. Learn what nurses do and how they are trained.
2. Learn how nurses make clinical decisions and assess patients.
3. Learn about the settings where nurses work.
4. Learn about the procedures that nurses perform.

Component 2/Unit 7: Quality Measurement and Performance

This unit describes the concepts of quality measurement and performance improvement. The unit begins by setting the context of known quality problems in healthcare and then describes how quality is measured and efforts to improve it. The unit also discusses the role of information technology, incentives for quality improvement, and quality measurement under meaningful use.

Unit Objectives: By the end of this unit the student will be able to:

1. Define healthcare quality and the major types of quality measures: structural, process, and outcome measures.
2. Describe the current state of healthcare quality in the United States.
3. Discuss the current healthcare quality measures used in various healthcare settings in the US, including those required for the HITECH meaningful use program.
4. Describe the role of information technology in measuring and improving healthcare quality.
5. Describe the results of current healthcare quality efforts in the US.

Component 2/Unit 8: Ethics & Professionalism

This unit describes the traditions and values that guide physicians, nurses, and allied health professionals. It explores medical ethics, professionalism and legal duties and applies ethics and professionalism to specific topics, including health informatics.

Unit Objectives: By the end of this unit the student will be able to:

1. Provide an orientation to ideas about medical ethics and professionalism.
2. Explore the relationships among ethical ideals, professionalism, and legal duties.
3. Apply the general principles of ethics and professionalism to specific topics.
4. Examine ethical issues in health informatics.

Component 2/Unit 9: Privacy & Security

This unit defines privacy, confidentiality, and security of health information, including the HIPAA Privacy and Security Rules.

Unit Objectives: By the end of this unit the student will be able to:

1. Define and discern the differences between privacy, confidentiality, and security.
2. Discuss the major methods for protecting privacy and confidentiality, including through the use of information technology.
3. Describe and apply privacy, confidentiality, and security under the tenets of HIPAA Privacy Rule.
4. Describe and apply privacy, confidentiality, and security under the tenets of the HIPAA Security Rule.

Component 2/Unit 10: Sociotechnical Aspects: Clinicians and Technology

This unit looks at the challenges of adapting work processes to new technology, and the resulting impact on quality, efficiency, and safety. This unit also examines the phenomena of social and technical resistance to change, especially among clinicians.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the concepts of medical error and patient safety.
 2. Discuss error as an individual and as a system problem.
 3. Compare and contrast the interaction and interdependence of social and technical “resistance to change”.
 4. Discuss the challenges inherent with adapting work processes to new technology.
 5. Discuss the downside of adapting technology to work practices and why this is not desirable .
 6. Discuss the impact of changing sociotechnical processes on quality, efficiency, and safety.
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Component 3: Terminology in Health Care and Public Health Settings

Component 3/Unit 1: Understanding Medical Words

This unit describes the meanings of medical words.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the four parts of medical terms.
2. Recognize word roots and combining forms.
3. Identify the most common prefixes and suffixes.
4. Describe the anatomical positions.
5. Define the body planes.
6. Identify regions of the body.
7. Define directional and positional terms.
8. Build, divide, spell and pronounce common medical words.

Component 3/Unit 2: Integumentary System

This unit describes the integumentary system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Integumentary System.
2. Describe common diseases and conditions with an overview of various treatments related to the Integumentary System.

Component 3/Unit 3: Musculoskeletal System

This unit describes the musculoskeletal system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Musculoskeletal System.
2. Describe common diseases and conditions, with an overview of various treatments related to the Musculoskeletal System.

Component 3/Unit 4: Blood, Lymphatic and Immune System

This unit describes the blood, lymphatic and immune systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Blood, Lymphatic and Immune Systems.
2. Describe common diseases and conditions with an overview of various treatments related to the Blood, Lymphatic and Immune Systems.

Component 3/Unit 5: Cardiovascular System

This unit describes the cardiovascular system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Cardiovascular System.
2. Describe common diseases and conditions with an overview of various treatments related to the Cardiovascular System.

Component 3/Unit 6: Digestive System

This unit describes the digestive system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Digestive System.
2. Describe common diseases and conditions with an overview of various treatments related to the Digestive System.

Component 3/Unit 7: Endocrine System

This unit describes the endocrine system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Endocrine System.
2. Describe common diseases and conditions with an overview of various treatments related to the Endocrine System.

Component 3/Unit 8: Ears, Nose, Throat, Eye and Vision

This unit describes the ears, nose, throat, eyes and vision.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Ears, Nose and Throat and Eyes and Vision.
2. Describe common diseases and conditions with an overview of various treatments related to the Ears, Nose and Throat and Eyes and Vision.

Component 3/Unit 9: Nervous System

This unit describes the nervous system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Nervous System.
2. Describe common diseases and conditions with an overview of various treatments related to the Nervous System.

Component 3/Unit 10: Reproductive System

This unit describes the reproductive systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Female Reproductive System and Male Reproductive System.
2. Describe common diseases and conditions with an overview of various treatments related to the Female Reproductive System and Male Reproductive System.

Component 3/Unit 11: Respiratory System

This unit describes the respiratory system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Respiratory System.
2. Describe common diseases and conditions with an overview of various treatments related to the Respiratory System.

Component 3/Unit 12: Urinary System

This unit describes the urinary system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define, understand and correctly pronounce medical terms related to the Urinary System.
2. Describe common diseases and conditions with an overview of various treatments related to the Urinary System.

Component 3/Unit 13: Public Health and Healthcare System Terminology

This unit describes public health.

Unit Objectives: By the end of this unit the student will be able to:

1. Define frequently used public health terms.
2. Identify distinguishing features of public health.
3. Identify categories and factors that influence health.
4. Identify terms commonly used as measures of health status.
5. Define frequently used healthcare systems terms.
6. Identify and define types of patients in various healthcare settings.
7. Identify and define the healthcare professions.

Component 3/Unit 14: What is Health Information Management and Technology?

This unit describes health information management and technology.

Unit Objectives: By the end of this unit the student will be able to:

1. Define and explain the terms and concepts used in the field of Health Information Management and Technology.
2. Understand the terms that frame Health Information Management (HIM) and Health Information Technology (HIT) practice.
3. Describe health IT hardware and software.
4. Define acronyms and abbreviations.

Component 3/Unit 15: Electronic Health Records

This unit describes the overview and introduction to the electronic health record (EHR).

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the function of the health record.
2. Describe the American Recovery and Reinvestment Act of 2009 (ARRA) including the portion of the bill called the Health Information Technology for Economic and Clinical Health Act (HITECH) Act of 2009.
3. Define meaningful use.
4. Discuss the difference between an EHR, EMR, and PHR.
5. Define functional requirements of an electronic health record (EHR).
6. Identify the purposes of EHR components.
7. Describe methods to ensure data security and confidentiality.

Component 3/Unit 16: Standards to Promote Health Information Exchange

This unit describes definitions and concepts in the electronic health record (EHR).

Unit Objectives: By the end of this unit the student will be able to:

1. Define terms related to standardized terminologies.
2. Identify and define HIPAA standard code sets.
3. Identify and define terminologies and vocabularies that represent nursing care.
4. Define and give examples of data interchange standards.

Component 4: Introduction to Information and Computer Science

Component 4/Unit 1: Basic Computing Concepts, Including History

This unit introduces basic computing concepts and terminology. It identifies common elements of computers, both in terms of hardware and software and provides information on selecting a computer by discussing the range of computer types, from desktops to laptops to servers. Finally, it provides a history of the development of computing and healthcare information systems over time.

Unit Objectives: By the end of this unit the student will be able to:

1. Define what a computer is.
2. Describe different types of computers, including PCs, mobile devices and embedded computers.
3. Define the common elements of computer systems.
4. Describe the various hardware and software options for typical desktop, laptop and server systems for home and business use with a focus on healthcare systems.

5. Explain the development of computers and the Internet, including healthcare systems, up until the present time.

Component 4/Unit 2: Internet and the World Wide Web

This unit covers the implications, origins, and use of the Internet and the World Wide Web, including the advantages and disadvantages of this technology.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the Internet and how to connect to it.
2. Define the World Wide Web and how to access it.
3. Write effective search queries for Internet search engines, filter the results and evaluate credibility of information.
4. Discuss security and privacy concerns on the Internet.
5. Describe ethical issues for the Internet.
6. Explore online healthcare applications and associated security and privacy issues including HIPAA.

Component 4/Unit 3: Computer Hardware

This unit provides a foundation on how a computer functions and how data is represented in memory, input and output devices, and the CPU, including its role in system functionality.

Unit Objectives: By the end of this unit the student will be able to:

1. List the major elements of a computer.
2. Describe how data is stored in memory and in secondary storage.
3. Describe how data is represented in binary notation.
4. Describe the function of the central processing unit (CPU) of the computer.
5. Describe how data is input/output from a computer.
6. Describe how the elements of a computer system work together.
7. Explain how specialized architectures and embedded systems are used in healthcare settings.

Component 4/Unit 4: Computer Software

This unit covers application and system software, with a focus on healthcare systems. It also describes the functions of operating systems, presents different operating systems, and defines the purpose and usage of file systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Define application vs. system software.
2. Give examples of application software focusing on healthcare systems.
3. Describe the functions of system software.
4. List different types of operating systems.
5. Explain the purpose and usage of file systems.

Component 4/Unit 5: Computer Programming

This unit discusses the purpose and types of programming languages from simple machine code to high level programming languages, including the process of compiling and interpreting. Students will use variables, loops and conditional statements to build a simple program. Finally, this unit

presents some advanced programming concepts such as Object Oriented Programming.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the purpose of programming languages.
2. Differentiate between the different types of programming languages and list commonly used ones.
3. Explain the compiling and interpreting process for computer programs.
4. Learn basic programming concepts including variable declarations, assignment statements, expressions, conditional statements and loops.
5. Describe advanced programming concepts including objects and modularity.

Component 4/Unit 6: Databases and SQL

This unit discusses the purposes of databases, a relational database, and the querying language SQL. Students will design a simple database using data modeling and normalization. This unit will define basic data operations, provide instruction on how to create common query statements, and discuss SQL implementation.

Unit Objectives: By the end of this unit the student will be able to:

1. Define and describe the purpose of databases.
2. Define a relational database.
3. Describe data modeling and normalization.
4. Describe the structured query language (SQL).
5. Define the basic data operations for relational databases and how to implement them in SQL.
6. Design a simple relational database and create corresponding SQL commands.
7. Examine the structure of a healthcare database component.

Component 4/Unit 7: Networks

This unit covers the history and evolution of computer networks, including the various types of network communications. Various forms of networking addressing are also covered, including network topologies, standards and protocols, logical model concepts, network hardware, and wireless communication.

Unit Objectives: By the end of this unit the student will be able to:

1. List and describe the various types of network communications and network addressing.
2. List and define the different types of networks.
3. Describe different network topologies.
4. List and describe different network standards and protocols.
5. Describe wireless communication.
6. List and describe network hardware.

Component 4/Unit 8: Security

This unit covers common security concerns and safeguards, including firewalls, encryption, virus protection software and patterns, and programming for security. Additional topics include security of wireless networks, and concerns, mitigations, and regulations related to healthcare applications.

Unit Objectives: By the end of this unit the student will be able to:

1. List and describe common security concerns.

2. Describe safeguards against common security concerns.
3. Describe security concerns for wireless networks and how to address them.
4. List security concerns/regulations for health care applications.
5. Describe security safeguards used for health care applications.

Component 4/Unit 9: Information Systems

This unit defines information systems and describes how they are used. It discusses how an information system is designed, developed, tested, supported and maintained. Finally, it explains how information systems are used in healthcare settings, including the role of specialized information systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Define an information system, how one is used and list examples.
2. Describe the components of an information system.
3. Describe the process developing an information system.
4. Describe the different types of testing and when testing should occur.
5. Describe how information systems are supported and maintained over time.
6. Describe specialized information systems.
7. Explain how information systems are used in healthcare.

Component 4/Unit 10: Future of Computing

This unit covers five topics concerning the future of computing: trends in computing, interfaces used to communicate with computer systems, cloud computing, the changing social implications of the use of computer systems, and the ubiquity of computers in our daily lives.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the latest advances in technology.
2. Discuss the implications of advances in technology for healthcare systems, including potential risks.

Component 5: History of Health Information Technology in the U.S.

Component 5/Unit 1: Evolution of Health IT: The Early Years

This unit describes the early years of the evolution of health IT.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the enduring values that have been foci for HIT stakeholders and how the social, educational, and professional environments in healthcare influence these values.
2. Discuss the impact of key developments in the 1950s and 1960s including Sputnik, Medicare/Medicaid legislation and medical research on

healthcare.

3. Describe how medical records and the use of health information technology changed from the 1950's through the 1980's.
4. Describe some of the key informatics innovations in the 1970's and 1980's including the problem-oriented medical record, Medline, the early electronic medical records and clinical decision support systems.
5. Discuss the increasing professionalization of informaticians and HIT professionals including training programs and professional organizations.

Component 5/Unit 2: Evolution of Health IT: The Modern Era

This unit describes the evolution of health IT from 1990 - 2009.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss factors that led to increasing clinical use of computers from 1990- 2009.
2. Discuss key influences on health IT developments including the Internet, HIPAA, and the Institute of Medicine reports.
3. Discuss the focus of health IT in the late 90s up to the present.
4. Discuss the role of health IT in clinical and translational research and personalized medicine.
5. Discuss why there is more receptivity to the use of Health IT now than during the previous 50 years.

Component 5/Unit 3: Evolution of Health IT: The HITECH Act

This unit describes the background and provisions of the HITECH Act.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the barriers to adoption of Health IT that the HITECH Act is designed to address.
2. Discuss how the following ARRA/HITECH requirements relate to previous developments in health IT:
 - a. Certified electronic health records
 - b. Concept of meaningful use including e-prescribing, clinical decision support, interoperability and HIE, structured documentation of quality measures
 - c. Incentives to providers
 - d. Education of clinicians
 - e. Workforce development.
3. Give examples of how the HITECH provisions support healthcare reform efforts.
4. Discuss the overall vision for the effects of the HITECH Act.

Component 5/Unit 4: Evolution of Public Health Informatics

This unit describes the evolution of public health informatics.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss how the sub-discipline of public health informatics has evolved over time.
2. Describe how health IT (HIT) can be used to enhance public health practice.
3. List potential ethical, social, and political issues associated with the development of HIT applications for public health purposes.

Component 5/Unit 5: Evolution of Nursing Informatics and HIT Tools Used By Nursing

This unit describes the evolution of nursing informatics and the HIT tools used by nursing.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe some early examples of electronic medical records.
2. Discuss lessons learned from the early EHR implementations.
3. Discuss how the attributes that were identified for a computer-based patient record in the 1991 Institute of Medicine Report relate to the concept of meaningful use.
4. Discuss differences between the terms electronic health record (EHR) and personal health record (PHR).

Component 5/Unit 6: History of Electronic Health Records (EHRs)

This unit describes the history of electronic health records.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the purpose of programming languages.
2. Differentiate between the different types of programming languages and list commonly used ones.
3. Explain the compiling and interpreting process for computer programs.
4. Learn basic programming concepts including variable declarations, assignment statements, expressions, conditional statements and loops.
5. Describe advanced programming concepts including objects and modularity.

Component 5/Unit 7: History of Clinical Decision Support Systems

This unit describes the history of clinical decision support systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe various types and structures of clinical decision support (CDS) systems.
2. Discuss the evolution of clinical decision support from expert system research.
3. Discuss the changes in focus of clinical decision support from the 1980s to the present.
4. Discuss the change in architecture and mode of access of clinical decision support systems from the 1980s to the present.
5. Describe some of the early clinical decision support systems.
6. Discuss the historical challenges in implementing CDS.

Component 5/Unit 8: History of CPOE and E-Prescribing

This unit describes the history of CPOE and e-prescribing.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain how the evolving capabilities of CPOE systems impact quality and patient safety in the hospital setting.
2. Explain how the evolving capabilities of e-prescribing systems impact quality and patient safety in the ambulatory setting.

Component 5/Unit 9: History of Health Information Exchange

This unit describes the history of health information exchange.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe historical U.S. efforts at realizing health information exchange.
2. Define community health information networks or CHINs and regional health information organizations known as RHIOs.
3. Describe why CHINs failed in the 1990s.
4. Describe the concept of RHIOs and articulate how they relate to Nationwide Health Information Network now called the NwHIN.

Component 5/Unit 10: History of Privacy and Security Legislation

This unit describes the history of privacy and security legislation in the US.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the reasons why the administrative simplification provisions were attached to the original HIPAA legislation.
2. Explain the five principles underlying the HIPAA privacy rule.
3. Discuss the reasons why the privacy rule was an action of the executive, not the legislative branch of Congress.
4. Describe security recommendations in the 1997 report "For the Record."
5. Describe the major changes in privacy and security requirements as a result of HITECH and the reasons why the changes were needed.

Component 5/Unit 11: Software Certification and Regulation

This unit describes the history of software certification and regulation.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the history of FDA involvement in the regulation of clinical software.
2. Describe the origins, focus and activities of CCHIT.
3. Discuss the changes in the EHR certification process as a result of the HITECH Act.
4. Discuss the recent efforts to improve the safety of EHRs.

Component 5/Unit 12: History of Mobile Computing

This unit describes the history of mobile computing in healthcare.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the developments in mobile computing that have enabled portable computers to be used in health care settings.
2. List the benefits of using mobile computers in the clinical setting, and discuss how these benefits have developed over time.
3. Give examples of three applications for mobile computers in healthcare.

Component 5/Unit 13: History of Telemedicine

This unit describes the history of telemedicine.

Unit Objectives: By the end of this unit the student will be able to:

1. Define telemedicine.
2. Describe the differences between telemedicine and telehealth.
3. Discuss key developments in the history of telemedicine.
4. Identify and describe at least two current applications of telemedicine.

Component 5/Unit 14: History of Quality Improvement and Patient Safety

This unit describes the history of the use of information technology as a part of quality improvement and patient safety.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe conditions and notable publications concerning patient safety and quality improvement from 1959 to the present.
2. Describe the background to the Institute of Medicine reports on Patient Safety
3. Summarize the main findings from several Institute of Medicine reports on quality, patient safety, and health information technology (HIT).
4. Describe various ways in which HIT has evolved to improve quality or enhance patient safety.

Component 5/Unit 15: Payment-Related Issues and the Role of HIT

This unit describes payment-related issues and the role of HIT.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the evolution of incentives for adoption of HIT.
2. Discuss direct and indirect ways in which health care payors can influence the adoption of HIT.
3. Describe past and current strategies employed by payors to influence HIT adoption.

Component 5/Unit 16: History of Health IT Organizations

This unit describes the history of health IT organizations.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the background and original constituencies of AMIA, HIMSS, and AHIMA.
 2. Describe the changes in major interests that have occurred at AMIA, HIMSS, and AHIMA over time.
 3. Describe the origins, current focus, and relationships among the following standards development organizations: HL-7, HITSP, ONC Health IT Standards Committee.
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Component 6: Health Management Information Systems

Component 6/Unit 1: What is Health Informatics?

This unit defines information management, information technology, and informatics, describes the fundamental theorem of informatics, explains the meaning of biomedical and health informatics as a field of study, and offers definitions of the major biomedical informatics areas of applications. It also provides an overview of informatics drivers and trends in the health care field. Lecture b defines the informatics team, their skills, roles and responsibilities, and identifies how health informaticians process data into information and knowledge for health care tasks with the support of information technology to improve patient care.

Unit Objectives: By the end of this unit the student will be able to:

1. Define information management, information system (technology) and informatics
2. Explain the basic theoretical concept that underlies informatics practice.
3. Define the meaning of biomedical and health informatics as a field of study.
4. Describe the biomedical informatics areas of applications.
5. Summarize the informatics drivers and trends.
6. State the professional roles and skills of health informaticians.
7. Identify how health informaticians process data into information and knowledge for health care tasks with the support of information technology to improve patient care.

Component 6/Unit 2: Health Information Systems Overview

This unit defines the concept of an information system and its characteristics, describes the different types of information systems, and describe various types of technologies that support health care information systems. Lecture b examines the challenges presented by emerging trends in information technology (e.g., mobility, web services, the Internet, Intranet, and wireless computing), social media, and global communications and discusses the advantages and disadvantages of using the Internet as a platform for health care applications.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the concept of an information system and its characteristics.
2. Describe the different types of information systems.
3. Describe various types of technologies that support health care information systems.
4. Examine the challenges presented by emerging trends in information technology, social media, and global communications.
5. Discuss the advantages and disadvantages of using the Internet as a platform for health care applications.

Component 6/Unit 3: Electronic Health Records

This unit defines an electronic medical record (EMR) and electronic health record (EHR) and explains their similarities and differences, identifies attributes and functions of an EHR, discusses the issues surrounding EHR adoption and implementation, and describes the impact of EHRs on patient care. Lecture b links EHRs to the Health Information Exchange (HIE) and the Nationwide Health Information Network (NHIN) initiatives, discusses how HIE and NHIN impact health care delivery and the practice of health care providers, summarizes the governmental efforts related to EHR systems

including meaningful use of interoperable health information technology and a qualified EHR, describes the Institute of Medicine's vision of a health care system and its possible impact on health management information systems, and lists examples of the effects of developments in bioinformatics on health information systems.

Unit Objectives: By the end of this unit the student will be able to:

1. State the similarities and differences between an electronic medical record (EMR) and electronic health record (EHR).
2. Identify attributes and functions of an EHR.
3. Describe the perspectives of health care providers and the public regarding acceptance of or issues with an EHR, which can serve as facilitators of or major barriers to its adoption.
4. Explain how the use of an EHR can affect patient care safety, efficiency of care practices, and patient outcomes.
5. Discuss how Health Information Exchange (HIE) and Nationwide Health Information Network (NHIN) impact health care delivery and the practice of health care providers.
6. Outline issues regarding governmental regulation of EHR systems, such as meaningful use of interoperable health information technology and a qualified EHR.
7. Summarize how the Institute of Medicine's Vision for 21st Century Health Care and Wellness may impact health management information systems.
8. Identify how ongoing developments in biomedical informatics can affect future uses and challenges related to health information systems.

Component 6/Unit 4: Computerized Provider Order Entry (CPOE)

This unit defines CPOE, states the purpose of CPOE, lists attributes and functions of CPOE, and explains how CPOE is currently being used in health care. Lecture b describes the major value to adopting CPOE applications, identifies the common barriers to adoption, and summarizes the potential impact CPOE has on patient care safety, quality and efficiency, and patient outcomes.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the purpose, attributes and functions of CPOE.
2. Explain ways in which CPOE is currently being used in health care.
3. Discuss the major value to CPOE adoption.
4. Identify common barriers to CPOE adoption.
5. Identify how CPOE can affect patient care safety, quality and efficiency, as well as patient outcomes.

Component 6/Unit 5: Clinical Decision Support Systems

This unit will offer a definition of clinical decision support, provide some historical context surrounding clinical decision support, describe the requirements of a clinical decision support system, and discuss the relationship of clinical practice guidelines and evidence-based practice to clinical decision support systems. Lecture b will identify the challenges and barriers in building and using clinical decision support systems, explain how legal and regulatory technologies may affect their use, and introduce the future directions for clinical decision support systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the history and evolution of clinical decision support.
2. Describe the fundamental requirements of effective clinical decision support systems.
3. Discuss how clinical practice guidelines and evidence-based practice affect clinical decision support systems.

4. Identify the challenges and barriers to building and using clinical decision support systems.
5. Discuss legal and regulatory considerations related to the distribution of clinical decision support systems.
6. Describe current initiatives that will impact the future and effectiveness of clinical decision support systems.

Component 6/Unit 6: Patient Monitoring Systems

This unit offers a definition of patient monitoring systems, describes the purpose, attributes, and functions of patient monitoring systems, discusses the primary applications and how automation can improve quality of care, and analyzes how the integration of data from many sources assists in medical decision making. Lecture b discusses how telehealth communication technologies support clinical care, explains the effectiveness and economic benefit of telehealth, and examines the role smart technology in the home and remote links to health information systems play in enhancing the quality of patient care.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the purpose, attributes, and functions of patient monitoring systems.
2. Discuss ways in which automation can improve the quality of patient care.
3. Analyze how the integration of data from many sources assists in making clinical decisions.
4. Discuss how telehealth communication technologies support clinical care.
5. Discuss the effectiveness and economic benefit of telehealth.
6. Examine how smart technology in the home and remote links to health information systems can enhance the quality of patient care.

Component 6/Unit 7: Medical Imaging Systems

This unit offers a definition of medical imaging, describes the purpose, processes, and management issues of medical imaging systems, analyzes the economic and technological factors that must be considered in the adoption of digital displays in radiology departments, looks at the major challenges with imaging systems faced by health care institutions and informaticians, and examines the future directions for imaging systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Examine the purposes, processes, and management issues.
2. Understand the economic and technological factors associated with digital displays.
3. Describe the major challenges.
4. Describe the future directions.

Component 6/Unit 8: Consumer Health Informatics

This unit provides a definitions of health communication, e-Health, consumer health informatics, and interactive health communication, identifies how the Internet has impacted consumer health informatics, explains how current and emerging technologies may affect consumer health informatics, and introduces the role of genomics in consumer health informatics. Lecture b offers definitions of personal health records or PHRs, describes the role of PHRs and their implications within health care, and discusses the challenges of consumerism in health information systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain how current and emerging technologies have impacted and may continue to affect consumer health informatics.
2. Describe the role of genomics in consumer health informatics.

3. Describe the emergence of personal health records and their implications.
4. Discuss how consumerism influences the ongoing development and use of health information systems.

Component 6/Unit 9: Administrative, Billing, and Financial Systems

This unit examines the relationship of administrative, billing, and financial systems to the health care information system, explains applications that need to be integrated in health care information systems, explores health care organizations' integration strategies, identifies the critical elements for integration of these systems with clinical information systems, and discusses how health care organizations may gain valuable insights from integrated data through data analytics and trending. Lecture b defines a master patient index or MPI and describes its core elements and discusses current trends to establish a unique patient identifier.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain applications that need to be integrated in health care information systems.
2. Describe the strategies used by health care organizations to ensure integration of functions.
3. Discuss the critical elements needed to integrate billing, financial, and clinical systems.
4. Discuss the core elements of a Master Patient Index (MPI).
5. Describe current trends to establish a Unique Patient Identifier (UPI).

Component 7: Working with Health IT Systems

Component 7/Unit 1: Introduction & Overview: Components of HIT Systems

This unit is an introductory unit where the core definitions and concepts of systems in general and healthcare specifically are presented. Using hands-on exploratory lab exercises, students will be introduced to an example HIT system where they will learn basic navigation and gain familiarity with components common to many clinical HIT systems. Specific examples of HIT systems from a variety of settings will be discussed.

Unit Objectives: By the end of this unit the student will be able to:

1. Define a system and relate systems concepts to Health IT (HIT).
2. Discuss specific examples of settings where HIT is used (acute, rural, public health, clinic, office, patient home, etc.).
3. Identify common components of a clinical HIT system.
4. Demonstrate beginning level competency in maneuvering the demonstration EHRs.

Component 7/Unit 2: Under the Hood

This unit is designed to introduce students to the generic functions of HIT systems that underpin inpatient and outpatient (ambulatory) processes. Crafted HIT lab exercises will lead the student through a simulated patient encounter to highlight how HIT systems support, and sometimes thwart, information flow.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the health IT functions that support a generic ambulatory patient care process.
2. Identify the health IT functions that support a generic inpatient care process.

Component 7/Unit 3: Understanding Information Exchange in HIT Systems

This unit will focus upon the functional aspects of interoperability within and between systems. Applying didactically presented concepts to hands on lab assignments, students will be challenged to locate and collate data from disparate systems and to assist users in planning for enhanced information flow in HIT systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify entities that are commonly involved in HIT system data exchange.
2. Explain the need for standards and why they exist.
3. Define and differentiate between vocabulary, content exchange, and privacy and security standards.
4. Compare current efforts to facilitate health information exchange between providers, communities, regions, and nation (NHIN, HIEs, NHIN Direct).

Component 7/Unit 4: The Effective IT System

This unit is designed to emphasize the aspects of HIT that contribute to effectiveness and meaningful use. The concepts of usability, consistency, and reliability in regards to HIT systems and how each contributes to, or detracts from, effectiveness will be presented. Definitions of evidence-based practice and guideline-enhanced care will be covered in addition to how HIT can support effective, safe, and efficient patient-centered care.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify characteristics of an effective HIT system.
2. Define and provide examples of how evidence-based practice can be supported in HIT Systems.
3. Define and cite examples of usability / configurability / scalability and reliability in HIT Systems.
4. List and contrast different types of reports/queries (predefined vs. ad hoc) required for internal and external reporting.

Component 7/Unit 5: Fundamentals of Usability in HIT Systems—What Does It Matter?

This unit will present the basic concepts of usability in general and HIT usability specifically. Students will be exposed to usability bottlenecks and learn to identify usability roadblocks in the EHRS lab system, hypothesizing potential downstream effects of poor usability, and suggesting solutions/alternate designs. This unit will detail the relationships between usability, user satisfaction, and workarounds.

Unit Objectives: By the end of this unit the student will be able to:

1. Define usability in relation to HIT systems.
2. Explain the impact of HIT usability on user satisfaction, adoption, and workarounds in error rates or unintended consequences.
3. Provide alternatives to HIT usability bottlenecks.

Component 7/Unit 6: HIT Facilitated Error—Cause and Effect

This unit is a unit that will focus upon error in health and healthcare that can be facilitated and propagated by HIT. Different classes of HIT errors (slips/mistakes, omission/commission) will be discussed and differentiated. Specific scenarios that create opportunities for HIT facilitated error will be presented to students in the lab exercises. In these exercises, students will apply concepts learned in the didactic portion of this unit to identify error, classify error, analyze root cause, and propose solutions.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain the concept of facilitated error in HIT.
2. Cite examples of situations where HIT systems could increase the potential for user error.
3. Analyze sources of HIT facilitated errors and suggest realistic solutions.

Component 7/Unit 7: Protecting Privacy, Security, and Confidentiality in HIT Systems

This unit is designed to present an overview of the concepts of privacy, security, and confidentiality of protected health information (PHI) in relation to HIT systems. Threats to PHI frequently encountered in HIT environments such as password sharing, offsite access to EHRs, challenges of staff turn-over and student access, unauthorized access, etc. will be detailed. Students will be exposed to simulated breaches of privacy, security and confidentiality of PHI in lab exercises, asked to identify, and propose strategies to thwart.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain and illustrate privacy, security, and confidentiality in HIT settings.
2. Identify common threats encountered when using HIT.
3. Formulate strategies to minimize threats to privacy, security, and confidentiality in HIT systems.

Component 7/Unit 8: HIT System Planning, Acquisition, Installation, & Training: Practices to Support & Pitfalls to Avoid

This unit is a unit where the core definitions and concepts of HIT systems planning, acquisition, installation, and training are presented. A variety of different settings will be used as examples in the unit, including small office practices, community clinics, acute care facilities, and skilled nursing facilities. Students will conduct simulated user needs analysis, and using the lab EHRs, will identify gaps in meeting those needs. Students will develop training plans for a variety of settings.

Unit Objectives: By the end of this unit the student will be able to:

1. Conduct a basic user needs analysis for a given example situation.
2. Create a plan for training users in a small office practice, a large community clinic, or a single unit in an ambulatory care setting.
3. Identify several potential challenges that may emerge during installation and generate a strategy to solve (space, wiring, lack of basic computer literacy in staff, etc.).

Component 7/Unit 9: Potential Issues with Adoption and Installation of an HIT system

The basics of human behavior, change, and adaptation will be discussed. Strategies for dealing with barriers to implementation (human and structural) will be covered.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify frequently encountered challenges to adoption and implementation of HIT systems.
2. Design an action plan to address barriers to implementation of an HIT system.
3. Propose solutions to common problems in the implementation of HIT systems.

Component 7/Unit 10: HIT and Aspects of Patient-Centered Care

Patient-centered care will be defined and explained. The aspects of HIT that support (and detract) from patient-centered care will be discussed. Specific examples will be provided. Students will explore aspects of HIT that currently support patient-centered care and will propose new methods for enhancing patient-centered care.

Unit Objectives: By the end of this unit the student will be able to:

1. Define patient-centered care.
2. Suggest HIT-enabled solutions/strategies to enhance patient involvement in health and healthcare.
3. Assess the effectiveness of HIT systems in supporting patient-centered care.
4. Perform self-assessment of personal beliefs related to HIT and patient-centered care.

Component 7/Unit 11: Health IT in the Future

This unit will focus upon future directions for HIT. New areas of research and development in HIT will be examined. Students will gain a foundational understanding of these areas and will debate appropriateness and feasibility of new HIT development areas.

Unit Objectives: By the end of this unit the student will be able to:

1. Speculate the relationship between HIT and health reform.
2. Suggest alternative design for usable & supportive HIT.
3. Hypothesize how HIT may intersect with publicly available data to improve health (i.e. point of sale, weather, GIS, foods, etc).
4. Predict avenues of future innovations in HIT.

Component 8: Installation and Maintenance of Health IT Systems

Component 8/Unit 1: Elements of a Typical EHR System

This unit provides an overview of what a typical electronic health record system is and focuses on the elements that make up such a system -- hardware, networks, software, and storage requirements.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the use of client and server hardware for access to and storage of EHRs.

2. Describe network needs for access to and storage of EHRs.
3. Identify the application software and back-end data storage software needed for a comprehensive, effective Health IT System.

Component 8/Unit 2: System Selection – Software and Certification

This unit will discuss the differences in COTS (Commercial Off-The-Shelf) and in-house/homegrown systems and how to select the system to meet the needs of the end users. We will also look at the advantages of purchasing a CCHIT-certified system and discuss ARRA and “meaningful use” in the context of EHR systems. Lastly we will look at estimating the typical costs associated with EHR system startup.

Unit Objectives: By the end of this unit the student will be able to:

1. Compare and contrast COTS (Commercial Off-The-Shelf) and in-house/homegrown systems and describe their relative advantages and disadvantages.
2. Verify system compliance with ONC-ATCB certification.
3. Identify purpose and categories of ARRA “Meaningful Use” criteria.

Component 8/Unit 3: System Selection – Functional and Technical Requirements

This unit will discuss the 12 different steps associated with system selection focusing on defining user functional requirements of systems and technical requirements (by the system), including how to determine, document, prioritize, and act on those requirements through the use of case studies and other means.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify 12 possible steps to choosing an EHR system.
2. Gather functional requirements from institution and users.
3. Document use-cases and relate them to functional requirements.

Component 8/Unit 4: Structured Systems Analysis and Design

This unit will discuss the basics of developing a project plan and the role of a project manager.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the 8 basic components to a project plan.
2. Define the role of a project manager.
3. Equate the basic project plan components to a typical EHR implementation plan.
4. Create a project plan for system design and implementation.

Component 8/Unit 5: Software Development Life Cycle

This unit introduces the student to the SDLC model and explores its application to well-known software and its utility for healthcare IT systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the steps of the Software Development Life Cycle, or SDLC, and the purpose and importance of each.
2. Describe different models of the SDLC and their key differences.

3. Describe how and why an HIT software application would go through the SDLC.

Component 8/Unit 6: System Security Procedures and Standards

This unit includes Federal State and local health information regulations for EHRs, computer and network system vulnerabilities and best practices for identification and mitigation of those vulnerabilities, information access and protection measures, and user security training.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify regulatory requirements for EHRs.
2. Provide training for system users regarding the methods and importance of security compliance.
3. Identify administrative, physical, and technical safeguards for system security and regulatory compliance.
4. Identify best practices for system security.
5. Identify best practices for risk / contingency management.

Component 8/Unit 7: System Interfaces and Integration

This unit explores the issues and challenges involved in interfacing and integrating systems including understanding system requirements and the messaging and other techniques used between various systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Determine and document system interfaces and integration requirements.
2. Describe the pitfalls associated with installing a new application in an environment of pre-existing applications.
3. Give examples of interfacing modalities.

Component 8/Unit 8: Troubleshooting, Maintenance and Upgrades, and Interaction with Vendors, Developers, and Users

This Unit explores aspects of setting up a robust support structure for troubleshooting and maintaining the system, including developing troubleshooting and escalation procedures, measuring system performance, and communication with vendors (or local developers).

Unit Objectives: By the end of this unit the student will be able to:

1. Identify and implement an effective troubleshooting procedure for reporting, evaluating, fixing, deploying, and follow-up of errors, problems, or limitations for the system.
2. Integrate downtime schedule for OS, network, database, and client application maintenance and updates.

Component 8/Unit 9: Creating Fault Tolerant Systems, Backups, and Decommissioning

Unit Objectives: By the end of this unit the student will be able to:

1. Define availability, reliability, redundancy, and fault tolerance.

2. Explain areas and outline rules for implementing fault tolerant systems.
3. Perform risk assessment.
4. Follow best practice guidelines for common implementations.
5. Develop strategies for backup and restore of operating systems, applications, configuration settings, and databases and decommission systems and data.

Component 8/Unit 10: Developing a Test Strategy and a Test Plan

This Unit explores aspects of testing the system, including the use of performance baselines and the role of test plans.

Unit Objectives: By the end of this unit the student will be able to:

1. Gather user feedback and performance baseline for system validation and testing.
2. Document problems with their resolution status.
3. Create, execute, and document a test plan.

Component 8/Unit 11: Pilot Testing and Full-Scale Deployment

This Unit explores aspects of deploying the system to end users, including communication, technical support, user feedback, and system resource evaluation including initial pilot testing to obtain feedback before full deployment, including planning, identifying the user group, setting up the system, and gathering feedback.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify pilot testing, deployment steps, and group for pilot testing.
2. Develop a plan for training pilot users.
3. Gather and prioritize feedback from pilot test.
4. Recommend amount of legacy data to preload.
5. Develop a plan for implementation using best practices.
6. Identify post-implementation practices.

Component 9: Networking and Health Information Exchange

Component 9/Unit 1: ISO Open Systems Interconnection (OSI)

This unit will address the OSI, including the purpose and content of each of its seven layers: physical, data link, network, transport, session, presentation, and application. Products, processes, protocols and tools at each level will be explained. This unit will also focus on the flow of data through the models as data is transmitted and receive by end devices.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain the OSI representation of the various layers involved in networking, including the general functions of each layer and their interconnections.
2. Explain the concept of the Application layer.
3. Explain the concept of the Presentation layer.

4. Explain the concept of the Session layer.
5. Explain the concept of the Transport layer.
6. Explain the concept of the Network layer.
7. Explain the concept of the Data Link layer.
8. Explain the concept of the Physical layer.
9. Explain connection-oriented versus connectionless communication.
10. Explain the use of network addressing including security considerations and vulnerabilities.

Component 9/Unit 2: Network Media and Hardware Communication Devices

This unit is designed to help the student understand network media, hardware devices, and how to select appropriate items to meet the guidelines for usage.

Unit Objectives: By the end of this unit the student will be able to:

1. Select appropriate network media types (such as Ethernet and Wireless) to facilitate networking and data exchange, taking into account access and regulatory requirements.

2. Select appropriate hardware devices (such as routers, switches, and access points) to facilitate networking and data exchange, taking into account access and regulatory requirements.

Component 9/Unit 3: National and International Standards Developing Organizations

This unit introduces students to the national and international organizations that create standards used in networking and health information exchange.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain why standards related to networking and health information exchange are important in the current environment.
2. Standards development.

3. How standards are developed.
4. Who develops them.

5. How standards are accredited.
6. How standards are selected.
7. Understand different kinds of standards being developed and for what purpose.
8. Learn about Standards Developing Organizations and the standards they create.
9. Demonstrate how to find, obtain, and use standards that are needed to facilitate networking and health information exchange.

Component 9/Unit 4: Basic Health Data Standards

This unit provides an orientation to the important data-related standards that enable interoperable health data interchange.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand why it is necessary to use a common set of data elements with common names to be able to exchange and understand data from other places.
2. Understand what is meant by semantic interoperability.
3. Understand many of the sets of controlled vocabularies in use today – how they are used and who requires their use.
4. Understand the use, purpose and interrelation among sets of controlled vocabularies in use today.
5. Identify the more common controlled vocabularies in use today: ICD, CPT, DRG, NDC, RxNorm, and LOINC.
6. Identify the more common controlled vocabularies in use today: SNOMED, MEDCIN, MedDRA, Nursing terminologies, MeSH and UMLS.
7. Understand data elements; attributes of data elements.
8. Understand contribution of master meta-dictionary of data elements to semantic interoperability.
9. Explain how data structures can be built from basic data components.
10. Explain how templates and archetypes facilitate networking and information interchange.
11. Discuss Clinical Data Architecture (CDA), Continuity of Care Document (CCD), and Continuity of Care Record (CCR) Standards.

Component 9/Unit 5: EHR Functional Model Standards

This unit explores the functional requirements and standards for electronic health records (EHRs).

Unit Objectives: By the end of this unit the student will be able to:

1. Understand linking and aggregating data at all levels.
2. Understand how data may be interchanged among heterogeneous settings without loss of information.
3. Understand HL7 v2.x messaging communication standards.
4. Understand HL7 v3.0 messaging standards.
5. Understand other data interchange standards including DICOM for imaging standards, NCPDP for prescriptions and medication reimbursement, IEEE for device interface standards, ASC X12N for claims and reimbursement standards, ASTM for document exchange, and IHE for profiles and registry standards.
6. Explain how model-based standards are created.
7. Define the methodology development framework.
8. Describe HL7 v3.0 messaging standards.
9. Imaging standards.
10. Standards for pharmacy services.
11. Interface standards for medical devices.
12. Claims and reimbursement standards.
13. Concept of profiling.

14. Use and value of implementation guides.

Component 9/Unit 6: Health Data Interchange Standards

This unit emphasizes the importance of adhering to health data interchange these standards in order to ensure compatibility between systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the definition(s) of an Electronic Health Record.
2. Understand architecture for an EHR.
3. Identify and understand key standards for the EHR.
4. Understand the HL7 EHR Functional Model Standards.
5. Understand functional profiles.
6. Understand the standards for Functional Models for the PHR.
7. Understand the certification requirements for the EHR, PHR and functional profile.

Component 9/Unit 7: Supporting Standards for EHR Applications

This unit presents a set of standards that support the application layer of the OSI and extend EHR functionality.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the clinical decision support standard Arden Syntax.
2. Understand standards for clinical guidelines.
3. Understand object-oriented expression language for clinical decision support – GELLO.
4. Understand the clinical decision support standard Infobutton.
5. Understand disease management.
6. Understand other clinical decision support applications.
7. Understand other standards that help to support networking and reporting requirements as well as functionality to optimize the connectivity among heterogeneous systems deployed within a single enterprise.
8. Understand single sign-on standards and the HL7 Clinical Context Object Workgroup (CCOW) standard.
9. Understand regulatory standards.
10. Understand issues relating to person identifiers, master patient indices, and record locator services.

Component 9/Unit 8: Enterprise Architecture Models

This unit addresses different enterprise architecture models that provide an infrastructure for healthcare networks.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain regional healthcare networks – policy and implementation strategies.
2. Explain the concept of a Nationwide Healthcare Information network.
3. Explain the significance of Service Oriented Architecture in networking and health information exchange networks.

4. Explain the value of an Enterprise Architecture in networking and health information exchange networks.
5. Describe key elements of various service oriented architecture platforms and infrastructure options.

Component 9/Unit 9: Privacy, Confidentiality, and Security Issues and Standards

This unit explores issues related to creating an environment in which to transport data in a secure manner that ensures privacy and confidentiality.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain the concepts of privacy and confidentiality requirements and policies and learn how to implement the requirements.
2. Describe how to secure data storage and transmission using data encryption, signatures, validation, non-repudiation, and integrity (PKI, certificates, and security protocols).
3. Define access control methods.
4. Analyze access restrictions to data storage and retrieval (physical and software).

Component 9/Unit 10: Health Information Exchange

This unit explores the networking standards and the standards required for interoperability to enable the creation of Health Information Exchanges.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the purpose and importance of a Health Information Exchange strategy.
2. Understand what an HIE is.
3. Understand the components of an HIE.

Component 10: Fundamentals of Health Workflow Process Analysis & Redesign

Component 10/Unit 1: Concepts of Processes and Process Analysis

This unit focuses on the six aims for health care process improvement. In this unit, students are helped to understand the concepts of systems, systems thinking and health care processes. Such understanding provides a foundation for the study of clinical process analysis and redesign.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the purpose for process analysis and redesign in the clinical setting.
2. Describe the role of a Practice workflow and information management redesign specialist and contrast it with other roles such as technical support and implementation management of facility.
3. Explain how health care process analysis and redesign and meaningful use are related.
4. Analyze a health care scenario and identify the components of clinical workflow.
5. Given a scenario of a health care analysis and redesign, analyze the responsibilities of each participant in the process and how the roles complement

or overlap with one another.

6. Describe how the workflow processes used by a health care facility might differ depending on the type

Component 10/Unit 2: Internet and the World Wide Web

This unit covers the implications, origins, and use of the Internet and the World Wide Web, including the advantages and disadvantages of this technology.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the Internet and how to connect to it.
2. Define the World Wide Web and how to access it.
3. Write effective search queries for Internet search engines, filter the results and evaluate credibility of information.
4. Discuss security and privacy concerns on the Internet.
5. Describe ethical issues for the Internet.
6. Explore online healthcare applications and associated security and privacy issues including HIPAA.

Component 10/Unit 3: Computer Hardware

This unit provides a foundation on how a computer functions and how data is represented in memory, input and output devices, and the CPU, including its role in system functionality.

Unit Objectives: By the end of this unit the student will be able to:

1. List the major elements of a computer.
2. Describe how data is stored in memory and in secondary storage.
3. Describe how data is represented in binary notation.
4. Describe the function of the central processing unit (CPU) of the computer.
5. Describe how data is input/output from a computer.
6. Describe how the elements of a computer system work together.
7. Explain how specialized architectures and embedded systems are used in healthcare settings.

Component 10/Unit 4: Computer Software

This unit covers application and system software, with a focus on healthcare systems. It also describes the functions of operating systems, presents different operating systems, and defines the purpose and usage of file systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Define application vs. system software.
2. Give examples of application software focusing on healthcare systems.
3. Describe the functions of system software.
4. List different types of operating systems.
5. Explain the purpose and usage of file systems.

Component 10/Unit 5: Computer Programming

This unit discusses the purpose and types of programming languages from simple machine code to high level programming languages, including the

process of compiling and interpreting. Students will use variables, loops and conditional statements to build a simple program. Finally, this unit presents some advanced programming concepts such as Object Oriented Programming.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the purpose of programming languages.
2. Differentiate between the different types of programming languages and list commonly used ones.
3. Explain the compiling and interpreting process for computer programs.
4. Learn basic programming concepts including variable declarations, assignment statements, expressions, conditional statements and loops.
5. Describe advanced programming concepts including objects and modularity.

Component 10/Unit 6: Databases and SQL

This unit discusses the purposes of databases, a relational database, and the querying language SQL. Students will design a simple database using data modeling and normalization. This unit will define basic data operations, provide instruction on how to create common query statements, and discuss SQL implementation.

Unit Objectives: By the end of this unit the student will be able to:

1. Define and describe the purpose of databases.
2. Define a relational database.
3. Describe data modeling and normalization.
4. Describe the structured query language (SQL).
5. Define the basic data operations for relational databases and how to implement them in SQL.
6. Design a simple relational database and create corresponding SQL commands.
7. Examine the structure of a healthcare database component.

Component 10/Unit 7: Networks

This unit covers the history and evolution of computer networks, including the various types of network communications. Various forms of networking addressing are also covered, including network topologies, standards and protocols, logical model concepts, network hardware, and wireless communication.

Unit Objectives: By the end of this unit the student will be able to:

1. List and describe the various types of network communications and network addressing.
2. List and define the different types of networks.
3. Describe different network topologies.
4. List and describe different network standards and protocols.
5. Describe wireless communication.
6. List and describe network hardware.

Component 10/Unit 8: Security

This unit covers common security concerns and safeguards, including firewalls, encryption, virus protection software and patterns, and programming for security. Additional topics include security of wireless networks, and concerns, mitigations, and regulations related to healthcare applications.

Unit Objectives: By the end of this unit the student will be able to:

1. List and describe common security concerns.
2. Describe safeguards against common security concerns.
3. Describe security concerns for wireless networks and how to address them.
4. List security concerns/regulations for health care applications.
5. Describe security safeguards used for health care applications.

Component 10/Unit 9: Information Systems

This unit defines information systems and describes how they are used. It discusses how an information system is designed, developed, tested, supported and maintained. Finally, it explains how information systems are used in healthcare settings, including the role of specialized information systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Define an information system, how one is used and list examples.
2. Describe the components of an information system.
3. Describe the process developing an information system.
4. Describe the different types of testing and when testing should occur.
5. Describe how information systems are supported and maintained over time.
6. Describe specialized information systems.
7. Explain how information systems are used in healthcare.

Component 10/Unit 10: Future of Computing

This unit covers five topics concerning the future of computing: trends in computing, interfaces used to communicate with computer systems, cloud computing, the changing social implications of the use of computer systems, and the ubiquity of computers in our daily lives.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the latest advances in technology.
2. Discuss the implications of advances in technology for healthcare systems, including potential risks.

Component 11: Configuring Electronic Health Records

Component 11/Unit 1: Migration to an Electronic Health Record System

This Unit focuses upon the process of migrating to an Electronic Health Record System, and the Electronic Health Record life cycle.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the process of initial planning, including identification of stakeholders, champions, management and implementation teams, and determining appropriate members for a steering committee.
2. Develop a timeline for choosing and implementing an electronic health record, including defining the scope of implementation, budget estimates, and additional critical steps to build a basic strategic plan for implementation.

3. Develop functional requirements, including a workflow analysis and a gap analysis, and recognizing when to bring in expertise.
4. Develop and applying criteria for selecting an appropriate vendor for the electronic health record including.
5. Generate an RFI/RFP.
6. Select an appropriate system, including utilizing an appropriate ranking model.
7. Generate interface requirements.
8. Compare and contrast EHR solutions (e.g. locally hosted versus cloud solutions).
9. Negotiate a contract.
10. Develop a training plan.

Component 11/Unit 2: Patient Care Clinical Workflow; Multiple Perspectives of Patient Care (VistA Demo)

This unit introduces the student to patient care clinical workflows from multiple perspectives. A brief lecture introduces the concept of workflows and their relevance to EHR implementation. The lab exercises in this unit focus on the patient and demonstrate the use of EHRs through the workflows of clinicians and ancillary care providers in the outpatient, inpatient, and emergency department settings. The lecture in this unit compares workflows from a paper and EHR perspective. The focus in this unit is on change management.

Unit Objectives: By the end of this unit the student will be able to:

1. Register a patient in a VistA simulation EHR environment.
2. Enter vitals and chief complaint as a Medical Assistant in a VistA simulation EHR environment.
3. Enter a progress note as a Physician in a VistA simulation EHR environment.
4. Enter nursing notes and implement physician orders as a Registered Nurse in a VistA simulation EHR environment.
5. Understand the importance of clinical workflows in the functioning of EHRs.

Component 11/Unit 3: Implementing Clinical Decision Support (VistA Demo)

This unit discusses implementing clinical decision support, which broadly refers to providing clinicians or patients with computer-generated clinical knowledge and patient related information, intelligently filtered and presented at appropriate times, to enhance patient care. A short lecture is followed by a series of hands-on lab exercises through which students will learn how to configure and use three tools for decision support implemented in the EHR: Alerts or Notifications, Order Checks and Clinical Reminders.

Unit Objectives: By the end of this unit the student will be able to:

1. Define and discuss clinical decision support.
2. Describe, view and create Alerts/Notifications in a VistA simulation EHR environment.
3. Describe, view and create Order Checks in a VistA simulation EHR environment.
4. Describe, view and resolve Reminders in a VistA simulation EHR environment.
5. Discuss the value of these EHR functions as clinical decision support tools.

Component 11/Unit 4: Building Order Sets (VistA Demo)

This unit identifies the value of order sets as a quality control/quality improvement mechanism and an efficiency tool in clinical settings. Typically, order sets are created by clinicians with expertise in treatment plans. Through a series of lab exercises, students will learn how to take those treatment plans and implement them into specific order sets within the VistA simulation EHR system.

Unit Objectives: By the end of this unit the student will be able to:

1. Define and describe an order set.
2. Describe the benefits and costs associated with order sets.
3. Demonstrate the ability to build a variety of order sets in the VistA simulation EHR environment.

Component 11/Unit 5:

Templates are important tools in the collection of data manually entered into Electronic Health Record systems. When implemented appropriately, they can help to standardize the data entered into the system, provide controls that ensure the quality of the data captured, and provide data capture efficiencies through effective design and use. This unit provides a brief lecture followed by lab exercises that will provide the student with practical experience creating and using data entry templates.

Unit Objectives: By the end of this unit the student will be able to:

1. Access and use the template editor.
2. Effectively use the different field controls to promote data quality and efficiency of data entry.
3. Design, create and view Personal and Shared Templates for data entry.
4. Describe how the effective use of data entry templates supports quality care, patient safety and efficiency.

Component 11/Unit 6: Health Summary and Clinical Reminder Reports (VistA Demo)

The ability to quickly retrieve information from the EHR is a key function. Two reporting tools commonly implemented in EHR systems to support information retrieval are [1] the ability to generate standard reports that provide widely used information and [2] the ability to quickly create ad hoc reports to access information to meet more specific needs. In this unit, the student will learn the attributes of quality information and engage in lab exercises creating Health Summary and Clinical Reminder reports - two basic types reports found in the EHR.

Unit Objectives: By the end of this unit the student will be able to:

1. Design, view and create Health Summary reports in the VistA simulation EHR environment.
2. Design, view and create Clinical Reminder reports in the VistA simulation EHR environment.
3. Design, view and create ad hoc reports.
4. Describe how quality reporting functions in an EHR supports quality care, patient safety and efficiency.
5. Define the attributes of quality information.

Component 11/Unit 7: Privacy and Security in the US

This unit introduces the basic concepts of privacy and security and the surrounding regulatory requirements for health information. In addition, the concepts of risk management, authentication methods and malware will be introduced, as well as issues of physical and secondary device security.

Unit Objectives: By the end of this unit the student will be able to:

1. Compare and contrast the concepts of privacy and security.
2. List the regulatory frameworks for an EHR.
3. Describe the concepts and requirements for risk management.

4. Describe authentication, authorization and accounting.
5. Describe passwords and multi-factor authentication and their associated issues.
6. Describe issues with portable devices.
7. Describe elements of disaster preparedness and disaster recovery.
8. Describe issues of physical security.
9. Describe malware concepts .

Component 11/Unit 8: Meaningful Use and Implementation

This unit describes the meaningful use program of the Health Information Technology for Economic and Clinical Health (HITECH) Act of the American Recovery and Reinvestment Act (ARRA) from the vantage point of the VistA simulation electronic health record (EHR). It discusses eligibility for meaningful use incentive payments and the criteria for achieving those payments in Stage 1 of the program. It shows examples of some of the criteria from within screens of the VistA simulation EHR environment.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe meaningful use (MU) of health information technology in the context of the Health Information Technology for Economic and Clinical Health (HITECH) Act.
2. Define the criteria for Stage 1 of meaningful use for eligible professionals and eligible hospitals.
3. Demonstrate examples of meaningful use using the VistA Electronic Health Record (EHR).

Component 12: Quality Improvement

Component 12/Unit 1: Introduction to Quality Improvement and Health Information Technology

This unit will introduce the learner to the concept of health care quality and the importance of meaningful use of health information technology in improving health care quality. The Institute of Medicine aims of quality improvement are used to frame a discussion of the role of health information technology in leading to improvement of patient safety, efficiency, effectiveness, equity, timeliness, and patient-centeredness. The unit will also review the basic principles of quality improvement: set an aim, design a measure strategy, attempt change, and learn about your system. The learner is also provided with examples of how health IT can facilitate quality improvement and how well-crafted HIT solutions can improve safety, effectiveness, efficiency, equity, timeliness, and patient-centeredness of care and accomplish the best care for the whole population at the lowest cost.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the current challenges in health care quality.
2. Examine the components of the health care system that have an impact on quality.
3. Describe QI as a goal of meaningful use of HIT.
4. Analyze the ways that HIT can either help or hinder quality improvement.
5. Explain health care quality and quality improvement (QI).

Component 12/Unit 2: Principles of Quality and Safety for HIT

This unit is designed to introduce the learner to the magnitude of the problem of medical error in the US. The health care system and the role of the learning in helping to make our system safer is explored. Emphasis is placed on how the science of safety can be applied to health care and the impact of system factors on patient safety. Three principles of safe design are introduced (eliminate steps, create independent checks, and learn from mistakes).

Unit Objectives: By the end of this unit the student will be able to:

1. Investigate the fallibility of people and systems.
2. Describe the ways that every system is designed to achieve the results it gets.
3. Apply the basic principles of safe design.
4. Explain the ways that teams make wise decisions with diverse and independent input.

Component 12/Unit 3: Introduction to Reliability

This unit introduces the learner to the notion of high reliability organizations. Reliability principles, used to design systems that compensate for the limits of human ability, can improve safety and the rate at which a system consistently produces desired outcomes.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the basic concepts of reliability.
2. Understand what makes organizations highly reliable.

Component 12/Unit 4: Reliability and Culture of Safety

This unit introduces the learner to the notion of high reliability organizations, and the importance of transparency and speaking up to a culture of safety. Characteristics of a culture of safety are outlined and the role of the HIT professional in this culture is defined. Strategies and tactics for communicating risks and advocating for resolution in a resistant culture are discussed.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss reliability as a tool for ensuring safety.
2. Examine how ultra-safe organizations operate.
3. Identify how teams make wise decisions.

Component 12/Unit 5: Decision Support for Quality Improvement

This unit presents an in depth review of ways in which decision support can enhance quality and safety in patient care. Definitions of decision support are provided.

Unit Objectives: By the end of this unit the student will be able to:

1. Define decision support, its importance and why it is difficult to implement.
2. Compare decision support tools that help improve quality.
3. Analyze the benefits and shortfalls of alerts and clinical reminders.

Component 12/Unit 6: Workflow Design

This unit introduces the learner to good practices for determining current workflow design and whether this design can be supported by HIT. It also presents ways of assisting users to redesign clinical work-flow as needed without loss of quality and safety in the clinical environment. Discussion of questions to ask when determining hard-wired and mobile technology placement is included.

Unit Objectives: By the end of this unit the student will be able to:

1. Assess decision-making requirements in health or health care.
2. Construct a work process flow chart.
3. Appraise ways of incorporating decision-making requirements into HIT design.

Component 12/Unit 7: HIT Design to Support Teamwork and Communication

The unit focuses on ways in which HIT can be designed to support care coordination. The focus is on electronic tools to support communication and teamwork during hand-off, care planning, and care transitions. Incorporation of automatic referral requests, data transfer to longitudinal records, and shared problem lists and daily goal forms into the EHR is discussed as well as the utility of electronic whiteboards and clipboard tools.

Unit Objectives: By the end of this unit the student will be able to:

1. Assess the impact of teamwork and communication on patient safety and care coordination.
2. Investigate ways in which HIT design can serve as a barrier to effective communication.
3. Describe ways in which HIT design can enhance communication and care coordination.

Component 12/Unit 8: HIT and Infecting a Patient Safety Culture

This unit dives into the specifics of how poor design and misuse of technology can place patients and organizations at risk. A strong case is made for the responsibility of users to monitor information systems for risks and to ensure that they use these systems appropriately. Examples of poor design are provided, as well as their impact on patient care. The HIT professional's role in ensuring attention to usability and compatibility with workflow during the design and testing phase of implementation is discussed.

Unit Objectives: By the end of this unit the student will be able to:

1. Apply QI tools to the analysis of HIT errors.
2. Identify strategies for adaptive work that can be useful to HIT initiatives.

Component 12/Unit 9: HIT Implementation Planning for Quality and Safety

This unit focuses the attention of the learner on ways in which HIT implementation can be managed to ensure the quality and safety are maintained during the transition period. Use of internal support pools, super-users, and front-line clinical experts to provide at-the-elbow support during the transition period is discussed. Emphasis is placed on the need for local adaptation and ongoing development of skills so that users can gain expertise in

safe use of electronic health records and other information technology.

Unit Objectives: By the end of this unit the student will be able to:

1. Critique an implementation team and the roles they play in ensuring quality.
2. Analyze effective implementation planning.
3. Assess the quality implications of “big bang” versus staggered approaches.
4. Discuss “go live” support strategies that minimize risk.

Component 12/Unit 10: Measuring Quality

This unit we will discuss the basics of measurement for quality. We will introduce the concepts of understanding variation. We will also discuss the fact that the design of electronic documents and flow sheets have a significant impact on the ability to extract quality measures from the resulting database. The importance of rigorous design and testing of system reports used for quality purposes is emphasized. Sample quality measures that are frequently requested of HIT systems are identified, and questions that guide data extraction are suggested.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the basic concepts of variation.
2. Explain the attributes of an effective reporting system.
3. Examine the importance of having standardized and structured health information so that you can use those data to make valid reports.
4. Discuss how HIT can facilitate data collection and reporting for improving quality of care and patient safety.

Component 12/Unit 11: Data Quality Improvement

This unit will introduce the learner to the importance of data quality and the role of the HIT professional in monitoring and ensuring the quality of data in clinical information systems. The theme of this unit is "beginning with the end in mind" and a review of both measurable and intangible dimensions of data quality is provided. Examples of each dimension are reviewed and a business case for quality is presented.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the different purposes of data.
2. Discuss the impact of poor data quality on quality measurement.
3. Identify ten attributes of data quality and key process recommendations.
4. Explore the attributes of data quality and key process recommendations for maintaining data integrity.
5. Discuss common causes of data insufficiency.
6. Describe how health information technology design can enhance data quality.

Component 12/Unit 12: Learning from Mistakes: Error Reporting and Analysis and HIT

This unit is designed to assist the learner in understanding the role of HIT in error detection and reporting and analysis of errors. The unit pulls together the links between learning from mistakes and the science of safety and safe culture. It includes a review of three tools for error detection and reporting: automated surveillance systems, error reporting systems, and predictive analytics and modeling. Examples of two powerful quality improvement tools (root cause analysis and failure mode effects analysis) are provided and the role of HIT professional in contributing to these efforts is discussed.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain how reporting errors can help to identify HIT system issues.
2. Describe ways in which HIT can facilitate error reporting and detection.
3. Assess HIT for unintended negative consequences.
4. Examine common themes in HIT design deficiencies.
5. Apply QI tools to examine HIT errors.

Component 13: Public Health IT

Component 13/Unit 1: Overview & Contribution to Public Health Through Electronic Health Record Use

This unit will synthesize key reasons and current contextual factors for providers in clinical practice to improve public health practice using Electronic Health Records (EHRs).

Unit Objectives: By the end of this unit the student will be able to:

1. Explain what is public health?
2. Discuss what distinguishes public health from the other health sciences.
3. Explain public health's unique contributions to the health of the public.
4. To define Public Health (PH) Information Technology and PH Informatics.
5. To illustrate how innovative IT solutions are being applied to PH practice.
6. To explain the role of electronic health records and data exchange to clinical care and health care improvement.
7. Describe PH organizational structure.

Component 13/Unit 2: Privacy, Confidentiality and Security of Public Health Information

This unit will assist students as they apply health data definitions and standards, as well as privacy and confidentiality issues, in typical public health scenarios.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the exercise of principles of privacy, confidentiality, and security of public health information, in scenarios involving patients and health practitioners.
2. Identify the types of laws/Acts applicable to the treatment of public health information.
3. Locate resources for applicable state, local, and federal laws and/or Acts.
4. Interpret the treatment of and apply applicable laws/Acts to public health information in given patient or practitioner scenarios.
5. Identify the functions of a "covered entity" and a "business associate" in relation to the treatment of public health information.
6. Describe the objectives and roles of the HIPAA Privacy Rule and exceptions to HIPAA as they apply to public health.
7. Identify patient rights under the Notice of Privacy Practices.

8. Describe the potential civil and criminal penalties for a HIPAA violation.
9. Identify and summarize each HIPAA security requirement (administrative, physical, and technical).
10. Discuss policy, procedures, contracts, and plans in administrative safeguards.
11. Describe how the physical environment can impact security of information and develop solutions.
12. Discuss technical strategies that can be implemented for security purposes.
13. Identify the type of information that requires protection (e.g., diseases, demographics) and list examples.
14. Demonstrate the application of principles for the appropriate release of required patient information in given scenarios.
15. Identify examples of circumstances when patient information may be used without patient authorization.
16. Summarize the ARRA/HITECH amendments to HIPAA.

Component 13/Unit 3: Data Standards in Public Health Information Technology

Apply health data definitions and standards, as well as privacy and confidentiality issues, in typical public health scenarios.

[Note: This outcome applies jointly to units 2 and 3, which are related.]

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the New York City Department of Health and Mental Hygiene partnership with a commercial EHR vendor and how it created a public health-enabled EHR.
2. Demonstrate knowledge of public health-oriented clinical decision support including an integrated strategy using multiple tools such as alerts, order sets, smart forms, and quality reporting.
3. Describe the EHR "meaningful use" movement and how it could transform existing clinical/public health practices.
4. Describe the strategies, features, and systems needed for public health agencies to define and build the necessary connections to EHRs as identified by the "meaningful use" legislation.
5. Identify the essential features of four primary public health IT functions, including syndromic surveillance, bi-directional immunization registries, public health alerts, ad-hoc reporting, and more.

Component 13/Unit 4: Public Health Enabled Electronic Health Records and the Role of Public Health in Health Information Exchange

This unit will summarize/describe the main role, functions and applications of public health-enabled Electronic Health Records (EHRs).

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the New York City Department of Health and Mental Hygiene partnership with a commercial EHR vendor and how it created a public health-enabled EHR.
2. Demonstrate knowledge of public health-oriented clinical decision support including an integrated strategy using multiple tools such as alerts, order sets, smart forms, and quality reporting.
3. Describe the EHR "meaningful use" movement and how it could transform existing clinical/public health practices.
4. Describe the strategies, features, and systems needed for public health agencies to define and build the necessary connections to EHRs as identified by the "meaningful use" legislation.

5. Identify the essential features of four primary public health IT functions, including syndromic surveillance, bi-directional immunization registries, public health alerts, ad-hoc reporting, and more.

Component 13/Unit 5: Epidemiology Databases and Registries-Public Health Information Tools

This unit will explain how varying types of information technologies have application in public health practice.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the functions and key issues of epidemiology compared to clinical practice.
2. Define and distinguish among the components that make up epidemiology.
3. Identify the difference between environmental and mechanistic causes of disease.
4. Describe the components of epidemiological reasoning.
5. List the different types of epidemiology.
6. Define clinical epidemiology and its relationship with evidence-based practice.
7. Explain the current applications of epidemiology and how the results influence evidence-based practice.
8. Identify different sources of epidemiological databases and how information is updated and exchanged with clinical entities.
9. Describe the purpose of a registry, the types of information contained within a public health registries and how this information can be used.
10. Identify the defining characteristics of epidemiological registries.
11. Identify different entities that operate registries and how information from clinical practice gets imported into these registries.
12. Identify security and access issues in the information exchange between communities, clinical institutions, public health departments and federal agencies involved in public health prevention and control.

Component 13/Unit 6: Biosurveillance, Situational Awareness and Disaster Response

This unit will focus on identifying current needs and future directions for EHR biosurveillance, disaster-preparedness, and situational awareness in improving public health.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the traditional means used to monitor and report on disease spread within a community.
2. Identify current data sources used to track disease.
3. Describe the typical process of syndromic surveillance.
4. Identify strengths and weaknesses of using EHRs for biosurveillance.
5. Describe process for monitoring, reporting, and analyzing EHR biosurveillance data.
6. Identify how current and future findings from EHR biosurveillance improve public health operations and services.

Component 13/Unit 7: Public Health Reporting, Alerts and Decision Support

This unit will summarize the essential public health services and methods by which they can be improved through the use of EHRs in the context of the clinical care environment.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the current role of public health in the context of the clinical care environment.

2. Identify and describe three essential to public health services: Monitor Health; Diagnose/Investigate; Inform, Educate, Empower.
3. Identify current public health practices challenges in the essential public health services of: Monitor Health; Diagnose/Investigate; and Inform, Educate, Empower.
4. Identify the opportunities and limitations for EHRs to address these challenges in three primary areas (syndromic surveillance, notifiable disease reporting, and public health case investigation).
5. Describe challenges & limitations of EHRs to address these service areas.

Component 13/Unit 8: The Potential of Public Health IT for Health Promotion and Chronic Disease Prevention

This unit will explain a novel approach to developing and implementing health promotion programs in public health practice.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe and categorize issues/questions, data sets and factors (variables) that are used in descriptive epidemiology.
2. Describe how evidence-based recommendations may be appropriately used in implementing and evaluating health promotion and disease prevention.
3. Describe different types of health promotion and disease prevention and different methods of enacting health promotion programs.
4. Identify the steps in the process of implementing and evaluating prevention programs and interventions.
5. Identify the clinical preventive services that are linked to health promotion and disease prevention.
6. Describe how informatics can be incorporated into clinical preventive services.
7. Describe the history and foundation of geographic information systems and explain its role in evidence-based practice.
8. Identify the barriers to incorporating public health IT into clinical practice and potential methods for resolving these limitations.
9. Identify the existing and innovative methods for communicating and sharing health information with the public.

Component 13/Unit 9: Quality Reporting

This unit will summarize/describe the main role, functions and applications of public health reporting, alerts and decision support systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify/describe important characteristics and components of useful health care quality measurement systems.
2. Identify the past and present efforts to transform medical practice through pay-for-performance initiatives.
3. Identify national group efforts involved in the establishment of quality standards/metrics (NCQA, NQF, etc.) based upon claims and EHR data.
4. Describe how quality metrics are integrated, tracked, and used in EHRs and describe real-world implementations in eClinicalWorks, EPIC, NextGen.
5. Describe the use of EHR-based quality metrics in pay-for-performance incentive projects.
6. Summarize the preliminary findings/conclusions from the EHR pay-for-performance project and possible future directions.

Component 13/Unit 10: Encouraging Adoption/Use of Population Health Functions for Electronic Health Records (EHRs) and Consumer Functions for Personal Health Records (PHRs)

This unit will delineate the critical role of advocacy in adoption/use of EHRs and consumer functions for PHRs to improve public health.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify and describe population health functions of EHRs.
2. Describe the meaningful use criteria that are applicable to public health, population health, disease management and prevention.
3. Provide examples of common PHR systems (Microsoft HealthVault, Vendor-specific PHRs) and identify embedded consumer functions.
4. Describe EHR adoption and use, with a focus on fidelity to public health goals.
5. Describe the challenges in and barriers to adoption and use of population health functions for EHRs and Consumer functions for PHR.
6. Explain and apply a rationale that would encourage adoption and use of public health functions for EHRs and Consumer functions for PHR.
7. Demonstrate the ability to formulate a plan to encourage adoption and use of population health functions for EHRs and Consumer functions for PHR, given a setting, population and workflow environment.

Component 14: Vendor-Specific Systems

Component 14/Unit 1: Common Commercial Electronic Health Record (EHR) Systems Used in Ambulatory and Inpatient Care Settings

This unit will provide an introduction to common commercial electronic health record systems used in ambulatory and inpatient care, and provide ratings to facilitate organizational decision making.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the most common commercial electronic health record (EHR) systems used in ambulatory and inpatient care settings.
2. List Health Information and Management Systems Society (HIMSS) resources available on EHR systems.
3. Describe functions and applications of HIMSS resources available on EHR systems.
4. Describe functions and applications of KLAS ratings available on EHR systems.
5. Apply KLAS rating system to evaluate software selections for ambulatory and acute care EHRs.
6. Provide a summary of inpatient and ambulatory vendors.

Component 14/Unit 2: Certification of Commercial EHRs

This unit will focus on quality of certification of commercial EHRs, and how to apply Certification Commission for Health Information Technology (CCHIT), Joint Commission and National Patient Safety goals to decisions about commercial EHR vendor selections.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the Certification Commission for Health Information Technology (CCHIT) and its role in the certification of commercial EHRs.
2. Describe or give examples illustrating how CCHIT criteria are used for certification of HER systems.
3. Identify the benefits of 'meaningful use' of EHRs and identify examples of 'meaningful use' of EHRs in given scenarios.
4. Identify the three stages of implementation requirements for 'meaningful use' of EHRs.
5. Identify the role of governing bodies certifying commercial EHRs, including FDA oversight, the Joint Commission, and National Patient Safety Goals.

Component 14/Unit 3: How Do Organizations Select an EHR? Lessons From the Front Lines

This unit will evaluate key factors (costs of an EHR, including capital, licensing, and maintenance and staffing, and stakeholder needs) into workplace decisions for selecting vendor-specific systems.

Unit Objectives: By the end of this unit the student will be able to:

1. Demonstrate concept knowledge of the RFP process.
2. Identify the key stakeholders involved in EHR selection and the roles they each play.
3. Identify and give examples of the categories of project costs when selecting vendor-specific EHR systems.
4. Analyze the financial components that strengthen an EHR vendor.
5. Identify the key steps in the selection process for choosing an EHR vendor.

Component 14/Unit 4: Electronic Health Record Functionality

This unit will analyze the functionality of a vendor EHR system, given a set of user needs.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe EHR functionality of Results Review.
2. Describe the EHR functionality of Computerized Provider Order Entry (CPOE).
3. Describe the EHR functionality of Documentation.
4. Describe the EHR functionality of Messaging among different vendor systems.
5. Describe the procedures for billing supported by EHR vendor systems.

Component 14/Unit 5: System and Database Architectures Used in Commercial EHRs

This unit will compare database architectures employed by different vendor applications, for fulfilling different user purposes.

Unit Objectives: By the end of this unit the student will be able to:

1. Demonstrate concept knowledge of system and database architectures used in commercial EHRs.
2. Describe the health information systems landscape, including CPOE, Pharmacy, Lab, etc.
3. Identify the different EHR hardware platforms.
4. Compare different EHR operating systems and databases.
5. Explain the importance of security, privacy, auditing and performance monitoring in EHRs.

Component 14/Unit 6: Vendor Strategies for Terminology, Knowledge Management, and Data Exchange

This unit will evaluate EHR systems based on vendor strategies for terminology management, knowledge management and data exchange.

Unit Objectives: By the end of this unit the student will be able to:

1. Define interoperability.
2. Describe vendor strategies for terminology and knowledge management and how these impact interoperability.

3. Describe processes and requirements for exchanging data with personal health records.

Component 14/Unit 7: Assessing Decision Support Capabilities of Commercial EHRs

This unit will compare decision support capabilities and customizability, given different vendor EHRs.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the importance of clinical decision support systems.
2. Describe decision support capabilities and customizability of different vendor EHRs.

Component 14/Unit 8: EHR Go-Live Strategies

This unit will evaluate training and go-live strategies of different EHR vendors in terms of impact on cost, workflow, and patient safety.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe characteristics of training and go-live strategies that would facilitate implementation of a new Electronic Health Record (EHR) system.
2. Compare the advantages and disadvantages of a big-bang roll-out versus a phased roll-out and vice-versa.
3. Identify staffing, command center and on-site consultant considerations.
4. Compare strategies for monitoring system usage and change management.

Component 15: Usability and Human Factors

Component 15/Unit 1: People and Technology, Studies of Technology

Unit Objectives: By the end of this unit the student will be able to:

1. Explain the importance of technology in health.
2. Describe the contributions of Human-Computer interaction to the Health field.
3. Describe the seven stages of User Activity in Norman's Theory of Action.
4. Demonstrate concept knowledge of principles of user-centered design, methods of cognitive research, and sources of usability evidence.
5. Apply the principles of user-centered design to address the challenges to effective design.
6. Compare and contrast usability evaluation methods.
7. Identify and differentiate various types of errors in medicine.
8. Identify patient safety issues in the workplace and at home.

Component 15/Unit 2: Requirements Engineering

This unit will discuss applying requirements engineering methods to inform design and technology selection.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain the role of requirements gathering in usability evaluation.
2. Identify the uses, advantages, and disadvantages of data collection.
3. Methods used for requirements gathering.
4. Identify contextual design principles as they apply to the healthcare setting.
5. Describe the methods to interpret results of data collection.

Component 15/Unit 3: Cognition and Human Performance

This unit will enable the student to demonstrate concept knowledge of cognition and human performance models in their relevance to systems evaluation methods.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the concept of cognitive engineering.
2. Describe the representational effect as it applies to human computer interaction and web design.
3. Describe how humans process information and obtain skills.
4. Describe the Gestalt principles of perception and their relevance to human computer interaction and cognitive theory.
5. Describe the processes of memory and their relationship to web-design.
6. Describe the cognitive constructs for mental representation.
7. Explain how cognition and human performance models should inform iterative design processes.

Component 15/Unit 4: Human Factors and Healthcare

This unit will enable the student to apply concept knowledge of human factors to the evaluation of systems-design and the study of human errors and patient safety.

Unit Objectives: By the end of this unit the student will be able to:

1. Distinguish between human factors and human computer interactions (HCI) as they apply to usability.
2. Explain how cognitive, physical and organization ergonomics can be applied to human factors engineering.
3. Describe how the concepts of mental workload, selective attention and information overload affect usability.
4. Describe the different dimensions of the concept of human error.
5. Describe a systems-centered approach to error and patient safety.
6. Apply methods for measuring mental workload and information overload.
7. Describe how human factors analysis can be applied to the study of medical devices.

Component 15/Unit 5: Usability evaluation methods

This unit will enable the student to select the most appropriate usability evaluation method, given particular system, setting, and development phase.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the importance of usability in relation to health information technologies.
2. List and describe usability evaluation methods.

3. Given a situation and set of goals, determine which usability evaluation method would be most appropriate and effective.
4. Describe the appropriate tasks for a usability test.
5. Describe the usability testing environment, required equipment, logistics, and materials.
6. Conduct a cognitive walkthrough.

Component 15/Unit 6: Electronic Health Records and Usability

This unit will enable the student to apply principles of usability and design to critiquing EHR systems and to making recommendations for iterative improvement.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the role of usability testing, training and implementation of electronic health records.
2. Describe and define usability as it pertains to the EHR (HIMSS document).
3. Explain the challenges of EHR design and usability in typical workflow.
4. Identify a set of well-established principles of usability and design and describe their application to EHRs (HIMSS document).
5. Identify and explain usability methods for enhancing efficiency of use and minimizing likelihood of user error (HIMSS document).
6. Explain how user-centered design can enhance adoption of EHRs.
7. Describe Web 2.0 and novel concepts in system design.
8. Identify potential methods of assessing and rating EHR usability when selecting an appropriate EHR system (HIMSS document).

Component 15/Unit 7: Clinical Decision Support and Usability

This unit will enable the student to diagnose problems associated with a clinical decision support system.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the cognitive basis for decision making and its effect on clinical errors.
2. Discuss the role of usability testing, training and implementation of clinical decision support.
3. Describe and define usability as it pertains to clinical decision support.
4. Identify examples of usability barriers to adoption of clinical decision support.
5. Identify a set of well-established principles of usability and design and describe their application to clinical decision support.

Component 15/Unit 8: Approaches to Design

This unit will enable the student to characterize the multifaceted nature of the design process and evaluate whether a given user interface embraces sound principles of design to support usability goals.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain a user-centered design approach.
2. Define conceptual models.
3. Explain the iterative design process.
4. Describe requirements analysis and cognitive task analysis.
5. Characterize the role of prototypes in design.
6. Describe the principles of participatory design.

7. Describe principles of sound design to support usability.
8. Describe how Nielsen's heuristics and design principles apply to user interface design.
9. Explain the difference between low fidelity and high fidelity prototypes and when it would be appropriate to use one versus the other.
10. Unit Topics -
 - a. Translating requirements into design
 - b. Nielsen's heuristics and design principles
 - c. Classification exercise (card sorting)
 - d. Participatory design
 - e. Low fidelity prototypes
 - f. High fidelity prototypes
 - g. Iterative design

Component 15/Unit 9: Ubiquitous Computing

This unit will enable the student to describe the role of mobile and ubiquitous computing in healthcare.

Unit Objectives: By the end of this unit the student will be able to:

1. History of Ubiquitous computing and basic principles.
2. Describe the role of mobile and ubiquitous computing in healthcare.
3. Describe some of the technical Challenges.

Component 15/Unit 10: Designing for Safety

This unit will enable the student to diagnose various types of error and create or select potential solutions.

Unit Objectives: By the end of this unit the student will be able to:

1. Define "workflow analysis" and methods for examining and addressing human errors.
2. Design a workflow analysis study.
3. Identify common sources of error documented in research studies in medicine.
4. Apply the cognitive taxonomy of errors.
5. Apply principles underlying the design of healthcare systems for safety.

Component 15/Unit 11: Designing for Safety

This unit will enable the student to diagnose various types of error and create or select potential solutions.

Unit Objectives: By the end of this unit the student will be able to:

1. Define "workflow analysis" and methods for examining and addressing human errors.
2. Design a workflow analysis study.
3. Identify common sources of error documented in research studies in medicine.
4. Apply the cognitive taxonomy of errors.

5. Apply principles underlying the design of healthcare systems for safety.

Component 15/Unit 12: Information Visualization

This unit will enable the student to describe how information visualization can support and enhance the representation of trends and aggregate data.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify/describe the role of information visualization and describe its purpose in enhancing usability of health technology.
2. Describe how information visualization can support and enhance the representation of trends and aggregate data.

Component 16: Professionalism/ Customer Service in the Health Environment

Component 16/Unit 1: Customer Service in Healthcare IT

This unit describes Customer Service in Healthcare IT.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the definitions of customer service.
2. Identify customers' needs based on context.
3. Discuss different metrics to measure customer service in Healthcare IT.

Component 16/Unit 2: Professional Behavior in the Healthcare Environment

This unit describes Professional Behavior in the Healthcare Environment.

Unit Objectives: By the end of this unit the student will be able to:

1. Define contextual norms expected in healthcare organizations.
2. Discuss the importance of dress, deportment, demeanor, and grooming.

Component 16/Unit 3: Overview of Communication Relevant to Health IT

This unit describes the Overview of Communication Relevant to Health IT.

Unit Objectives: By the end of this unit the student will be able to:

1. Explain the purpose and goal of professional communication.
2. Describe what is meant by effective communication.
3. Discuss what is meant by ineffective communication.
4. Identify communication needs of common roles in healthcare.
5. Describe Disability Etiquette's contribution to professional communication.

Component 16/Unit 4: Key Elements of Effective Communication

This unit describes Key elements of effective communication.

Unit Objectives: By the end of this unit the student will be able to:

1. Discuss the definition of communication.
2. Discuss assumptions used in communication.
3. Discuss the communication models from general to health-specific.
4. Discuss variables used in communication.
5. Define nonverbal communications.
6. Describe how nonverbal communication functions in the human communication process.
7. Describe specific dimensions and give examples of nonverbal communication.
8. Discuss communication in paper-based and electronic formats.
9. Discuss personal communication in the work setting.
10. Understand the importance of listening skills.
11. Understand the role of diversity.

Component 16/Unit 5: Regulatory Issues: HIPAA and Standard Precautions

This unit describes Regulatory Issues: Standard Precautions and HIPAA.

Unit Objectives: By the end of this unit the student will be able to:

1. Characterize the importance of and guidelines associated with infection control.
2. Relate protecting yourself and others with standard precautions.
3. Explain HIPAA and communication.

Component 16/Unit 6: Team and Small Group Communication

This unit describes Team and Small Group Communication.

Unit Objectives: By the end of this unit the student will be able to:

1. Explore the phenomena of teams in our culture and look at the popularity and necessity of teams in delivering quality healthcare services.
2. Define a team as compared to a group.
3. Identify the stages of team development.
4. Identify the characteristics of successful teams and team members.
5. Analyze team conflict and performance.
6. Define what we mean by virtual teams.
7. Explore the guidelines for building and leading successful teams.

Component 16/Unit 7: Conflict Resolution

This unit describes Handling Conflict.

Unit Objectives: By the end of this unit the student will be able to:

1. Define conflict.
2. Explore historical views of conflict
3. Explore conflict as a positive/negative force
4. Study various styles for handling conflict.
5. Review ways to promote positive conflict in a group.

Component 16/Unit 8: Ethical and Cultural Issues Related to Communication and Customer Service

This unit describes Ethical and Cultural Issues Related to Communication and Customer Service.

Unit Objectives: By the end of this unit the student will be able to:

1. Characterize dimensions of ethics.
2. Identify major characteristics of culture.
3. Distinguish elements in intercultural communication.
4. Perform effective intercultural communication.

Component 16/Unit 9: Personal Communications and Professionalism

This unit describes Personal Communications and Professionalism.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe appropriate use of personal communication devices in the healthcare workplace.
2. Discuss the impact of inappropriate use of personal communication devices in the healthcare workplace.
3. Identify the differences between personal and professional communications.

Component 17: Working in Teams

Component 17/Unit 1: Health IT Teams: Examples and Characteristics

This unit is an introductory unit designed to highlight different types of health information technology teams and the purpose and functions of its different members. Characteristics of effective teamwork will also be discussed with emphasis on the organizational structure, individual contributions, and team processes. Why teams are valued for their collaborative efforts and teamwork will be outlined in this component. Activities for the learner include a virtual hospital tour that will facilitate the learner to explore different areas where HIT teams may be used, to interview a member of a HIT team and explore their job, purpose, skills, and contributions made to the team in addition to serving as a HIT team member who needs to select HIT team members to build an effective team for the work outlined in the case.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the characteristics of an effective team and work group.
2. Identify and differentiate roles of IT health care professionals in teams.
3. Describe the value of teams and the importance of collaboration for the HIT professional in teams.

Component 17/Unit 2: Forming and Developing a Team for HIT

This unit is designed to introduce students to the stages of team development: forming, storming, norming, and performing with the needs of the team identified at each stage. Common goals and purposes will be described in addition to information on key factors needed to maintain an effective team.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe stages of team development.
2. Identify the needs of the team at each described stage.
3. Establish and clarify common goals and purpose for a team.
4. Identify key characteristics of effective team members.
5. Identify key factors to maintain HIT teams.

Component 17/Unit 3: Initial Tools for Teaming: Ground Rules & Action Plans for HIT Teams

This unit is designed to introduce learners to specific guidelines and rules that may be associated with teams and working on a HIT team. A realistic learning activity that focuses on the learner developing a team action plan will bring this unit to the forefront for application and understanding of the team plan. Two major communication strategies, active listening, and assertive communication techniques will be included in this component and demonstrated through selected exercises in the module.

Unit Objectives: By the end of this unit the student will be able to:

1. Create and describe SMART ground rules.
2. Develop and refine a team action plan.
3. Establish ground rules and an initial action plan for an HIT team.

Component 17/Unit 4: Team Strategies and Tools to Enhance Performance and Patient Safety: TeamSTEPPS

This unit is focused upon the, “TeamSTEPPS,” methodology. This methodology, initially used by the Department of Defense to assist with coordination of military teams, was adapted (with the assistance of the Agency for Healthcare Quality & Research) for use in clinical environments. The goal of TeamSTEPPS is to improve teaming skills, enhance communication across provider teams, and to seed a fundamental culture change – all in the quest to improve patient outcomes. The material in this unit is based very heavily on the TeamSTEPPS materials which can be found on the Agency for Healthcare Quality and Research website. Some adaptation has been made (and noted) in order to apply TeamSTEPPS more directly to health IT teams. The point made repeatedly in this unit is that even though TeamSTEPPS is focused upon clinical teams in clinical environments, these techniques were conceived on the battlefield. Therefore, many of the concepts and skills learned in prior units will reappear in TeamSTEPPS, reinforcing the point that the foundations of high performing teams are similar regardless of where they are applied. Various tools and techniques are presented from the TEAMSTEPPS toolkit with suggestions for how these approaches can be adapted for use in health IT teams.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe what TeamSTEPPS is and how it can be used as an actionable improvement strategy.
2. Identify areas of application for TeamSTEPPS tools and methods to be used in HIT teaming.
3. Integrate the science of team performance and team training.

Component 17/Unit 5: Leveraging Integration Techniques: Power of HIT Team Dynamics

This unit will discuss techniques for team members to problem solve within their teams so the team can be more effective. Activities will include how to conduct a SWOT analysis and mind maps within this component. Different activities described within the module will be differentiated between team or individual task. Activities will include a SWOT analysis of a case-based team and other experiential activities associated with team tasks and specific roles within the team.

Unit Objectives: By the end of this unit the student will be able to:

1. Define decision support, its importance and why it is difficult to implement.
2. Compare decision support tools that help improve quality.
3. Analyze the benefits and shortfalls of alerts and clinical reminders.

Component 17/Unit 6: Articulating Feedback and Feedforward: Tracking Success and Change

This unit will provide information to the learner on tools and techniques for giving and receiving feedback regarding HIT team performance. Elements introduced include the use of formative and summative evaluations, conflict management, and appropriate communication channels. Participants will evaluate individual behaviors regarding stated ground rules for functioning as a member of an HIT team. The difference between feedback and feedforward will be clarified as students will incorporate the seminal elements of positive change into their dealings with others. Tools for serving as a change agent and tracking success will also be practiced by students in team exercises. Based upon the belief that we can change the future but we cannot change the past, participants will practice the steps to both delivering and receiving feedforward information. Also based on the belief that it can be more productive to help people be right than to prove they are wrong, participants will be challenged with developing strategies for applying feedforward mechanisms within HIT team involvement.

Unit Objectives: By the end of this unit the student will be able to:

1. Develop skills for clear communication and understanding of others.
2. Provide appropriate feedback to others.
3. Develop and deliver appropriate feedforward.
4. Communicate in ways that help promote positive change for your team.

Component 17/Unit 7: Leadership: All Members as Leaders—Leaderful Teams

This unit will challenge participants to critically evaluate elements that lead to success in the field of HIT. The changing role of leadership will be explored. Leadership has taken on new requirements as we have moved through the information and biotech ages into the conceptual age where the knowledge worker is being continually replaced by the conceptual leadership at every level in organizations. The expansive role of leadership that requires each team player to be prepared to “carry the torch” and lead others is a fundamental building block for HIT teams. Participants will

investigate leadership behavior across HIT platforms, identify key leadership skills, and demonstrate personal abilities across those skill areas as related to HIT teams.

Unit Objectives: By the end of this unit the student will be able to:

1. Develop and implement standards for shared leadership roles in complex, stressful, and often hierarchical health-related environments.
2. Differentiate progression from self-awareness to self-leadership to team leadership.
3. Demonstrate collective, concurrent, collaborative, and compassionate activity.

Component 17/Unit 8: Sharing Resources and Information: Tools to Optimize Performance of HIT Teams

This unit will equip participants with a working appreciation for tools and techniques that enable HIT teams to optimize performance both within their team and in collaboration with other teams, units, and organizations. Specific technologies and methods will be introduced and applied to HIT team settings. Participants will be provided an opportunity to use several of these tools and techniques as they simulate HIT team functions. Outdated views on how people share information will be highlighted. New frameworks in thinking regarding information access and decision making activities for successful HIT teams will be discussed. Meeting to share information will be discouraged as participants will become adept using some basic tools for collaboration. Meeting for purposes of clarifying options and making decisions will be encouraged along with applying tools and techniques to facilitate such meetings. Participants will select appropriate structural components to enable greater efficiencies of information sharing and decision making by HIT teams.

Unit Objectives: By the end of this unit the student will be able to:

1. Demonstrate skillful use of collaborative tools and techniques.
2. Develop a system to provide full transparency of key information related to actions of the HIT team.
3. Design an information sharing structure that supports high performance and knowledge exchange.

Component 17/Unit 9: Positioning for High Performance Teaming: Challenges and Opportunities in the HIT Environment

This unit provides participants an opportunity to gain insights into the criteria, processes, and structures that support the development of high performance for HIT teams. Observations from various industries, sports, and military examples will be compared with HIT team environments. Participants will draw from personal experiences in developing criteria for providing the requisite structure to support high performance teaming.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the characteristics of a high-performing team.
2. Identify key criteria for high-performance teaming.
3. Propose a team structure that enables high performance.

Component 17/Unit 10: Barriers to Success: Reading Early Warning Signs of HIT Team Failure

This unit prepares participants to recognize elements that lead to HIT team failures and provides several frameworks that can serve to maintain appropriate monitoring of more typical symptoms of team dysfunction. Elements of selfish behaviors, tool seduction, lack of confidence, arrogance, lone heroism, cowardice, and comfort will be examined along with appropriate responses to each. Effects such as common knowledge, in-group bias, false consensus, and transactive memory will be investigated along with proper mechanisms to alleviate negative consequences and mitigate further damage. Lessons will be gained by inspecting case histories of HIT teams involved in each of these elements. Participants will explore frameworks to

heighten awareness and early diagnosis of symptoms that lead to HIT team failures.

Unit Objectives: By the end of this unit the student will be able to:

1. Recognize key signals to team failure.
2. Use appropriate response mechanisms to address team dysfunction.
3. Facilitate consistent scanning for symptoms of potential team failure.

Component 17/Unit 11: Life Cycle of HIT Teams: Reforming and Repositioning Techniques

This unit introduces participants to the natural stages in team development and the normative life cycles of teams. The process of handling change will be investigated as participants work through understanding the elements of immobilization, denial of change, incompetence, acceptance of reality, frustration, understanding, and integration. Participants will be introduced to techniques employed to structure HIT teams for specific purposes and repurposing teams for new tasks.

Unit Objectives: By the end of this unit the student will be able to:

1. Classify the life-cycle stages of a team.
2. Apply strategies to move a team into the next formative stage.
3. Reposition a team for a new challenge.

Component 18: Planning, Management and Leadership for Health IT

Component 18/Unit 1: Introduction to Leadership

This unit describes leadership styles and theories of leadership.

Unit Objectives: By the end of this unit the student will be able to:

1. Define leadership.
2. Distinguish between leadership styles in the Blake and Mouton's Managerial Grid.
3. Define and describe classic leadership theories.
4. Describe characteristics of classic leaders.

Component 18/Unit 2: The Management and Leadership Distinction

This unit describes the management and leadership distinction.

Unit Objectives: By the end of this unit the student will be able to:

1. Compare and contrast concepts of leadership and management.
2. Describe the concept and importance of developing followership.

3. Discuss challenges of leading in a hybrid HIT organization.
4. Define and discuss the Project Management Institute's (PMI) three types of organizations.
5. Discuss pros and cons of temporary leadership.

Component 18/Unit 3: Key Concepts Associated with Leadership

This unit describes key concepts associated with leadership, including creativity and emotional intelligence.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe and discuss the role of authority in the HIT environment.
2. Compare and contrast recognized vs. expert authority in context with the healthcare environment.
3. Explain creativity's role in healthcare.
4. Explain the importance of recognizing and managing the cross-cultural organization.
5. Define emotional intelligence.
6. List and describe the four competencies in social intelligence.
7. Define motivation in the context of the current HIT environment.
8. Distinguish between intrinsic and extrinsic motivation.
9. Describe the role of motivation in group dynamics.

Component 18/Unit 4: Effective and Ineffective Leaders

This unit describes the traits of effective and ineffective leaders.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the common traits of effective leaders.
2. Describe skills needed in order for HIT leaders to be effective.
3. Describe the common traits of ineffective leaders.
4. Distinguish between de-motivating and motivating leaders.
5. Discuss ineffective leadership's role on stress in the work environment.

Component 18/Unit 5: Overview of the IT Strategic Planning Process

This unit provides a high level of overview of the IT Strategic Planning Process.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the importance of an Information Technology Strategic Plan.
2. Describe a typical IT Planning scenario.
3. Describe the importance of prioritizing HIT goals.
4. List common pitfalls in prioritizing IT investments.
5. Recognize common IT governance structures.

Component 18/Unit 6: Achieving External Alignment

This unit describes achieving external alignment among various stakeholders.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the importance of connecting with our external stakeholders.
2. Describe a typical Health Information Exchange (HIE).

Component 18/Unit 7: Team and Small Group Communication

This unit describes Team and Small Group Communication.

Unit Objectives: By the end of this unit the student will be able to:

1. Explore the phenomena of teams in our culture and look at the popularity and necessity of teams in delivering quality healthcare services.
2. Define a team as compared to a group.
3. Identify the stages of team development.
4. Identify the characteristics of successful teams and team members.
5. Analyze team conflict and performance.
6. Define what we mean by virtual teams.
7. Explore the guidelines for building and leading successful teams.

Component 18/Unit 8: Conflict Resolution

This unit describes Handling Conflict.

Unit Objectives: By the end of this unit the student will be able to:

1. Define conflict.
2. Explore historical views of conflict
3. Explore conflict as a positive/negative force
4. Study various styles for handling conflict.
5. Review ways to promote positive conflict in a group.

Component 18/Unit 9: Purchasing and Contracting

This unit describes the process for evaluating, purchasing and contracting Health Information Technology.

Unit Objectives: By the end of this unit the student will be able to:

1. Understand the process for selecting new technology.
2. Understand when to employ some of the most common tools of the trade for evaluating and selecting software.
3. Learn about evaluation aids and how they can affect an evaluation project.
4. Understand some of the accounting basics for software purchases.

5. Understand the process for gathering a team to negotiate a contract.
6. Understand the need for documenting contract goals and objectives.
7. Understand the purpose of a contract and how to participate in negotiation.
8. Understand the process for gathering a team to negotiate a contract.
9. Understand the need for documenting contract goals and objectives.
10. Understand the purpose of a contract and how to participate in negotiation.

Component 18/Unit 10: Change Management

This unit describes change management.

Unit Objectives: By the end of this unit the student will be able to:

1. Define change management.
2. Discuss the importance of change management to the success of Healthcare IT system implementations.
3. Describe the effects of introducing or changing information technology in a group or organization.
4. Identify elements critical to successful management of change.

Component 19: Introduction to Project Management

Component 19/Unit 1: An Overview of Health IT Projects

Students will receive a broad overview of project management including some distinctive characteristics of health IT projects. This unit includes several real scenarios to illustrate the diversity of projects in health IT.

Unit Objectives: By the end of this unit the student will be able to:

1. Review the history of project management.
2. Define what a project is.
3. Define project management.
4. Identify reasons that more organizations are implementing HIT projects.
5. Identify key characteristics for project success and failure.
6. Describe the range and characteristics of health IT projects.

Component 19/Unit 2: Project Life Cycles

This unit provides an overview of various project life cycles so that students can assess their appropriateness for use depending on characteristics of a project. Students examine processes, knowledge areas, and organizational influences that are critical to successful project management.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify process groups and knowledge areas used in project management.
2. Differentiate linear, iterative, adaptive, and agile project life cycles.
3. Relate life cycle phases to reviews, milestones, and deliverables.
4. Compare various organizational structures as contexts for managing projects.

Component 19/Unit 3: Project Selection and Initiation

Students learn what is necessary to get projects off to a strong start. Critical activities are to prepare a project charter and to identify and engage the project stakeholders.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the key elements of a project environment and HIT landscape.
2. Outline the needs for projects, how and why they are selected and initiated.
3. Construct a project charter.
4. Identify project stakeholders.
5. Generate a stakeholder register.

Component 19/Unit 4: Project Planning Overview

In this unit, students will learn how to effectively plan projects and to develop a project management plan. Several key documentation components will be introduced.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify the importance and purpose of effective planning.
2. Identify and describe each component of the project management plan.
3. Define and prepare project planning documents.

Component 19/Unit 5: Managing Project Scope

This unit addresses a critical determinant of project success: defining and managing the scope of the project. Students learn the importance of eliciting stakeholder requirements and developing effective work breakdown structures.

Unit Objectives: By the end of this unit the student will be able to:

1. Analyze scope to develop the project scope statement.
2. Elicit stakeholder requirements for the project.
3. Create a Work Breakdown Structure (WBS).

Component 19/Unit 6: Managing Project Time, Cost, and Procurements

In this unit, students will gain an understanding of how to manage project schedules and spending. The unit will cover broad topics such as purchasing, procurement, cost estimation and scheduling.

Unit Objectives: By the end of this unit the student will be able to:

1. Define project management time activities.
2. Define project cost management activities.
3. Define project procurement activities.

Component 19/Unit 7: Managing Project Risk

A key to successful health IT projects is the pro-active management of risks: beginning with the preparation of a risk management plan. Risk management will be a continuing activity throughout the project, to identify risks and to plan and implement risk responses.

Unit Objectives: By the end of this unit the student will be able to:

1. Assess project risks.
2. Plan project responses.
3. Prepare and maintain a risk register.
4. Develop and execute a risk management plan.

Component 19/Unit 8: Team Management and Communications

Whatever role you play on a project team, it is essential to understand basic concepts of team management and communications. This unit covers key elements of managing and communicating in a team, including the development of an HR and communications plan.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify and describe roles of project team members.
2. Develop the human resources plan.
3. Acquire, develop, manage, and lead the project team.
4. Identify project communications responsibilities.
5. Develop a communications plan.

Component 19/Unit 9: Project Monitoring and Control

Project managers use monitoring and control tools and techniques to assess plans and deliverables, evaluate progress against plans, manage change requests, and review all project activities. It is critically important to keep the project within scope, budget, and schedule to meet stakeholder expectations.

Unit Objectives: By the end of this unit the student will be able to:

1. Direct project execution.
2. Track, review, and report project progress and performance.
3. Monitor and control project baselines.
4. Manage stakeholder expectations and change requests.

Component 19/Unit 10: Quality Management

Quality is an elusive but essential component and consideration in any project. This unit will cover quality management planning and key characteristics

of quality assurance and its impact on project management.

Unit Objectives: By the end of this unit the student will be able to:

1. Develop a quality management plan.
2. Perform quality assurance.
3. Apply quality control techniques.

Component 19/Unit 11: Project Closure and Transition

It is essential that project managers know all the processes required to bring a project to a successful conclusion. Key steps include completing all deliverables on time, gaining customer acceptance, documenting the project lessons learned, and managing the transition to operations.

Unit Objectives: By the end of this unit the student will be able to:

1. Bring project activities to a close.
2. Conclude the customer acceptance process.
3. Document and archive lessons learned.
4. Update and close out project documents.
5. Manage transition to operations.

Component 20: Training and Instructional Design

Component 20/Unit 1: Introduction to Training and Adult Learning

This unit will apply the Instructional Systems Design method and the phases of the ADDIE model of instruction design, to a given population of adult learners.

Unit Objectives: By the end of this unit the student will be able to:

1. Define the levels of learning per Bloom's Taxonomic Domains (Cognitive, Affective, Psychomotor)
2. Describe the characteristic of adult learners and factors that could impact training design and learning outcomes
3. Describe the recommended training cycle of the Instructional Systems Design method
4. Describe the five phases of ADDIE model of instructional design

Component 20/Unit 2: Needs Analysis

This unit will discuss planning and implementing an instructional needs assessment, given a specific population of users in a health care setting.

Unit Objectives: By the end of this unit the student will be able to:

1. Identify an instructional design problem for a given group of learners and a training setting.
2. List a range of useful data collection methods for conducting needs assessments in healthcare settings.
3. Identify the principles of the planning and implementation process of an instructional needs assessment in a health organization setting.
4. Analyze learner, task, and situational characteristics.
5. Recognize the special training needs and constraints in a health care setting [such
6. As, time constraints and work pressures, resistance to change, impact of system on work flow and patient care, security requirements for EHRs, etc.
7. Project instruction plans based on data gathered from a needs assessment.

Component 20/Unit 3: Creating a Lesson Plan

This unit will demonstrate how to construct a lesson plan using appropriate instructional methods and approaches, given a specific population of learners.

Unit Objectives: By the end of this unit the student will be able to:

1. Write measurable goals and learning objectives for a training program which meet the SMART criteria (Specific, Measurable, Attainable, Relevant, and Time-bound).
2. Write specific learning objectives based on Bloom's Taxonomy, classifying learning from the simplest to the most complex levels.
3. Write learning objectives that are tied to needs analysis and outcomes.
4. Select appropriate activities for training objectives.
5. Identify the appropriate instructional approaches tied to a needs analysis, situational characteristics, and subject matter domain when designing a lesson plan.

Component 20/Unit 4: Selecting and Working with Media

This unit will how to construct an instructional product (simple online tutorial) using appropriate media, such as customized images, customized video (e.g., EHR screen captures).

Unit Objectives: By the end of this unit the student will be able to:

1. Select appropriate instructional media for a given lesson plan and objectives/goals.
2. Select and customize images to embed in training materials.
3. Select and customize video (e.g., EHR screen captures) to embed in training materials.
4. Design simple online tutorials using screen capture software.

Component 20/Unit 5: Building & Delivering Effective PowerPoint Presentation

This unit will describe how to create a custom PowerPoint presentation using the principles of effective PowerPoint design, given a particular training program and learner population.

Unit Objectives: By the end of this unit the student will be able to:

1. Construct a script or storyboard for a presentation.
2. Design a custom slide background for a training program.

3. Demonstrate the appropriate use of color and text in a presentation.
4. Embed graphics and video in a presentation.
5. Demonstrate the appropriate use of 'builds' and 'actions'.
6. Use the PowerPoint graph and chart functions for designing instructional materials.
7. Assess the training environment.
8. Modify a presentation to compensate for presentation constraints.
9. Demonstrate effective public speaking skills.
10. Operate necessary computer and AV equipment to make an effective multimedia presentation.

Component 20/Unit 6: Assessments

This unit will discuss how to conduct student outcome assessments and program evaluations in given training contexts.

Unit Objectives: By the end of this unit the student will be able to:

1. Design appropriate assessment/testing instruments and procedures aligned with instructional goals/objectives.
2. Administer assessments as a component of training/instructional design.
3. Conduct formative evaluations in one-on-one and group contexts.
4. Specify revisions to instruction resulting from the formative evaluations.

Component 20/Unit 7: Learning Management Systems

Design a training program in Learning Management Systems (LMS) that adhere to the standards and open source initiatives in online learning.

Unit Objectives: By the end of this unit the student will be able to:

1. Describe the basic functions and technologies in Learning Management Systems (LMS), Content Management Systems (CMS), Reusable Learning Objectives (RLO), and Learning Content Management Systems (LCMS).
2. Identify the role of standards and open source initiatives in online learning.
3. Describe why an instructional designer would SCORM.
4. Give two approaches to modify e-learning content to meet Section 508 Compliance guidelines.
5. Build a training program in an LMS using appropriate standards for online learning.

Component 20/Unit 8: Web 2.0 and Social Networking Tools

This unit will focus on how to select and implement Web 2.0 technologies as instructional technologies given a specific platform and training program.

Unit Objectives: By the end of this unit the student will be able to:

1. Distinguish between synchronous and asynchronous learning.
2. Use basic functions of an LMS or CMS.
3. Utilize different tools within the design and delivery of online training.
4. Select an appropriate platform for a particular training program.