

PROGRAM HANDBOOK (HEALTH INFORMATICS PROGRAM)



College of Nursing and Health Sciences



PROGRAM HANDBOOK (HEALTH INFORMATICS PROGRAM)

This handbook sets out a range of program information and, where applicable, points to a number of other important documents to help support you through your studies at the University.

The purpose of this handbook is to provide information about your program of study.

It is designed to support you throughout your studies and it is important to familiarise yourself with all the contents of this handbook.

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Program Profile (Health Informatics Program)

In the era of digitization, it is necessary to train and equip the healthcare professionals with the knowledge, skills and expertise of managing information in a secure and systematic form using technological approach. Health Informatics is one of the unique emerging disciplines that combine computer sciences, management sciences and Information and communication technology.

The program of HI prepares highly qualified students for information management and provides technical leadership including managing innovative projects in primary healthcare centers, hospitals and other allied healthcare organizations. These professionals perform a variety of health records related duties such as, managing patient's information by collecting, storing, analyzing and retrieving data to meet the professional, legal, ethical, and administrative requirements of the system.

In addition, the health informatics professionals are involved in designing and maintaining information management systems and excel in technical and decision making roles in various healthcare institutions. They could also be involved in project management duties in various businesses and commercialized entities catering to the routinely functional needs of health facilities. Computer software and information technologies enable health care organizations to automate the work of decision making for improved quality of care, cost control, and for successful care management.

Program Title

Bachelor of Health Informatics

Vision, Mission and Goals of the Program

Vision

Health Informatics program will be locally recognised with its excellence in academic education, scientific research and community services.

Mission

Health Informatics program is committed to provide high standardised academic education, scientific research, and community services within the spirit of professional ethics, responsibility and collaboration.

Program Goals

- To graduate competent health Informatics specialists to serve in different health informatics disciplines.

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- To foster multidisciplinary scientific research with relevant institutions and Ministry of Health, with emphasis on the digital health and health information systems.
- To promote professional ethics, team work and responsibility towards lifelong personal and community development.
- To engage in communities' services that expand their capacity to improve health, and digital health advocacy.
- To participate in advancing health informatics practices through consultancy services and continuous training programs.

Program Graduate Attributes

At the end of the program the graduates will have the following attributes;

Competent Health Informatician

- Graduates have a thorough knowledge of health informatics discipline, and can practice in a multi-professional context.

Creative and critical thinker

- Graduates utilize critical thinking and problem-solving principles and techniques to the current inquiries, investigations and research, and future challenges within the field of work.

Self – learner

- Graduates are responsible, resilient and have the capacity to autonomously manage the tasks and activities within the field of work.

Effective Communicator

- Graduates are effective communicators exhibiting interpersonal and leadership skills to actively participate in advancing the discipline and digital society.

Ethical Professional

- Graduates' practices and roles are consistent with the national, cultural, organizational and ethical values.

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Program Learning Outcomes

Knowledge and Understanding	
K1	Explain the principles, policies, procedures and functions related to the concepts of health informatics competency domains.
K2	Describe the technical processes necessary for effective health data management practices and their applications.
K3	Discuss the latest health informatics trends, safeguard measures, and related research methodologies for appropriate utilization of health care data.
Skills	
S1	Apply the scientific and creative skills related to health information system's planning, implementation, utilization, functionality and maintenance.
S2	Perform accurately health data management procedures utilizing information systems and applications and categorize them for clinical coding.
S3	Analyze the operational and technical issues related to information systems, networking, integration, security, statistical reporting and quality management.
S4	Demonstrate the investigative and research skills, while working in groups, exhibiting effective communication skills and group dynamics.
Values, Autonomy, and Responsibility	
V1	Represent responsible citizenship by adhering to professional, academic and organizational codes of conduct, attitude, and behavior.
V2	Demonstrate ability to lead, manage tasks autonomously, and contribute to the advancement of the community within the field of work.

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Program Duration

- Total duration is 4 years
- After finishing the four years, the students will have to work as an intern in different healthcare sectors (ministry, hospitals, primary healthcare centers, vendors and private dispensaries) for a period 48 weeks.

Credit Hours

- Total 129 credit hours

Potential Job Opportunities

- Health Informatics Specialist (Consistent with Saudi commission for health specialties classification and registration)

Other Potential Roles:

- Medical Records Officer
- Data Analyst
- Clinical Database Specialist
- eHealth Project Manager
- Informatics Researcher
- Health Information Security Officer
- Health Information Technology and Medical Software Vendors
- Chief Information Officer
- Health Data Coding Consultant

STUDY PLAN

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required	3	6	4.7%
	Elective			
College Requirements	Required	6	23	17.8%
	Elective			
Program Requirements	Required	38	94	72.9%
	Elective	1	2	1.5%
Capstone Course/Project	Required	1	4	3.1%
Field Training/ Internship	Required			
Residency year				
Others				
Total		49	129	100%

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Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	101 ISLM	Islamic Culture 1	Required	None	2	Institution
	102 ARAB	Arabic Writing	Required	None	2	Institution
	181 ENG	English Language for Health specialists 1	Required	None	4	College
	182 ENG	English Language for Health specialists 2	Required	None	4	College
Level 2	183 ENG	English Language for Health specialists 3	Required	181 ENG	3	College
	105 PHYS	Physics for Health Specialties	Required	181 ENG	3	College
	105 BIO	Biology for Health Specialties	Required	181 ENG	3	College
	105CHEM	Chemistry for Health Specialties	Required	181 ENG	3	College
Level 3	102 ISLM	Islamic Culture 2	Required	None	2	Institution
	211 PHS	Introduction to Public Health	Required	None	3	Program
	211 BHI	Learning Skills for Health Specialties	Required	None	2	Program
	212 Physio-2	Human Physiology	Required	105 BIO	2	Program
	220 ANAT	Introduction to Human Anatomy	Required	None	3	Program
	211 ENV	Principles of Environmental & Occupational Health	Required	105 PHYS, 105 CHEM	2	Program
	243 PHCL	Introduction to Ethics in the health professions	Required	None	2	Program
Level 4	212 HSM	Healthcare System and Policies	Required	None	2	Program
	213 PHS	Microbiology and Parasitology for Public Health	Required	220 ANAT, 212 Physio	3	Program
	214 PHS	First Aid and Physical Assessment	Required	220 ANAT, 212 Physio	2	Program
	215 PHS	Medical Terminology	Required	None	2	Program

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	221 HEP	Introduction to Health Education & Promotion	Required	None	2	Program
	221 BHI	Introduction to Health Informatics	Required	None	2	Program
	222 EPI	Principles of Epidemiology	Required	211 PHS	2	Program
	222 STA	Fundamentals of Biostatistics	Required	None	2	Program
Level 5	316 EPI	Disease Process	Required	None	3	Program
	322 BHI	Applications in Health Informatics	Required	221 BHI	3	Program
	323 BHI	Health Records	Required	None	3	Program
	323 STA	Applied Biostatistics	Required	222 STA	3	Program
	331 BHI	Fundamentals of Information Systems in Healthcare	Required	None	2	Program
	332 BHI	Introduction to Database	Required	None	3	Program
Level 6	313 HSM	Organizational Behavior in Health Care	Required	211 HSM	2	Program
	324 BHI	Sociology of Health and Illness	Required	None	2	Program
	325 BHI	Health Data Classification & Coding Systems	Required	215 PHS	4	Program
	333 BHI	Programming 1	Required	None	3	Program
	334 BHI	Database Management Systems	Required	332 BHI	3	Program
	352 GPH	Research Methodology	Required	323 STA 222 EPI	3	Program
Level 7	413 HSM	Health Economics	Required	None	2	Program
	415 HSM	Healthcare Quality & Patient Safety	Required	None	2	Program
	424 STA	Hospital Statistics	Required	323 STA	2	Program
	427 BHI	Project Management in Health Informatics	Required	None	3	Program
	435 BHI	Programming 2	Required	333 BHI	3	Program
	436 BHI	Health Systems Analysis and Design	Required	331 BHI	3	Program

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Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
	451 BHI	Health Research Design	Required	352 GPH	3	Program
Level 8	414 HSM	Health Service Management	Required	None	2	Program
	426 BHI	Legal & Ethical Aspects of Health Informatics	Required	None	2	Program
	428 BHI	Trends in Health Informatics	Required	None	2	Program
	429 BHI	Data Management and Visualization	Required	325 BHI	2	Program
	437 BHI	Human Computer Interaction	Required	None	3	Program
	459 BHI	Graduation Project	Required	451 BHI	4	Program
Electives	417 HSM	Financial Accounting in Healthcare	Elective	None	2	Program
	434 BHI	Mobile Computing in Healthcare	Elective	None	2	Program
	438 BHI	Network and Cybersecurity	Elective	None	2	Program
	439 BHI	Geographic Information System (GIS) for Public Health	Elective	None	2	Program

Course Descriptions

English Language for Health Specialties

The syllabus is in sync with the desired level of students, promoting critical thinking. It fulfills certain language abilities where students understand straightforward factual information about familiar and unfamiliar topics, and learn to communicate with confidence on routine and non-routine matters. Reading involves scanning, comprehending, and identifying the main ideas. Writing skills can be practiced through writing short paragraphs, and essays of direct relevance to their life activities and use the given study material. Listening and speaking is developed through communicative classes and self-study.

Principles of Biology

This course includes basic knowledge in biological organizations, biological molecules, cell biology, body tissues, organ systems of the human body. In addition, it contains offers information on molecular biology and basic genetics.

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Chemistry for Health Specialties

This course aims to provide a survey in basics of inorganic and physical chemistry as well as organic chemistry.

English Language for academic Purpose

The course covers academic vocabulary along with some more advanced grammatical structures. The approach of 'introducing and practicing' writing skill helps in involving the students to use the language spontaneously; it includes extensive materials for introducing academic texts and lectures (through reading and writing). The general academic writing framework is the basis for teaching writing skills (introduction, argument/ topic, conclusion/ opinion) along with the most common transitional phrases. Writing involves short paragraphs and essays of direct relevance to their life activities by using the given study material.

Principles of Physics

This course covers the fundamental knowledge of: general laws of motion, heat, fluids, electricity and magnetism, sound, light, and radiation.

Human Physiology

The course is required for all undergraduate second year applied medical sciences physical therapy, Dentist, Pharmacy, Public Health and Tropical Medicine and Nursing students. The course introduces the student to various bases of Human Physiology and theoretical concepts behind it. Also strong emphasis is provided on the humanistic holistic approach and develops an open communication with health care providers' team to facilitate the client healing process in a structured environment.

Introduction to Ethics in the Health Professions

This inter-professional ethics course involves teaching of rudimentary knowledge and skills in ethical theory and reasoning, professional ethics, inter professional approach to health care decision-making, goals of health care, illness experience, and other topics of concern.

Introduction to Human Anatomy

The following subjects will be included;

☐ Introduction to major component of human body. Digestive system: anatomy. Cardiovascular system: anatomy of heart & blood circulation, Respiratory system: anatomy. Renal system: anatomy of urinary system. Genital system male & female: anatomical structure. Endocrine glands: definition, pituitary gland (Thyroid, Adrenal, Pancreas, testes, ovaries). Nervous system: brain & spinal cord, sympathetic and parasympathetic nerves. Skeletal and muscular system.

Introduction to public health

The course is designed to introduce the multi-disciplinary nature and core functions of public health field. Public health concepts, disciplines, services, achievements and history, tools and challenges will be presented so that the student will have sufficient background of public health practice. The Students will have the opportunity to review and apply basic principles of public health through individual and group assignments and selected case – studies based on daily life public health issues and events as reflected in news or perceived by experts.

Learning Skills for Health Specialties

This course is designed to improve the general competencies of students which are required for their academic as well as professional life. This will include involving students in activities which

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will improve their reading, writing, communication and academic management skills. The course will share a practical based approach in addition to theory and will comprise of demonstrations and practices. Computer aided learning will be highlighted. The skills acquired will support the students in writing academic essays, making and presenting PowerPoint presentations, performing a literature search helpful for their graduation projects and researches and prepare them for group projects and public speaking as well. The course intends to provide students with a platform to explore their potential abilities and is strategically placed at level 3 of the programs to assist them in higher levels. The course will provide the students with time management and stress management concepts including tips for achieving a successful and healthy academic lifestyle. The teaching strategies utilized include and not limited to lectures, group discussions, practical demonstrations, e-learning, assignment writing and presentations.

Principles of Environmental and Occupational Health

Environmental and occupational health is a multi-disciplinary field that involves both the physical sciences (physics, chemistry, biology, geology, geography, resource technology and engineering) and the social sciences (resource management and conservation, demography, economics, politics and ethics). It encompasses the surrounding conditions that affect man and other organisms. Introduction to environment, ecology, ecosystem and fundamental characteristics of ecosystem, the environmental health components (water & sanitation, housing, disposal of wastes, air pollution, vector control, food safety, energy, and trans boundary global health concerns. The history and concept of occupation health and occupational hazards, diseases and control.

Introduction to Health Informatics

This course introduces the health informatics discipline, as the foundation for further study in this inter-professional/multidisciplinary field. This course traces the history of health information management and the role of the Electronic Health Record (EHR) and other clinical informatics applications in healthcare organizations. This course provides knowledge that is essential for self-selection of subspecialty or pursuit of study in the health informatics field. Emphasis is given to clinically transformative technologies, communication processes and information practices in healthcare.

This course provides a rigorous introduction to the principles of informatics pyramid. The focus of this course is on the study of the nature of health information system architecture and its use in clinical practice and clinical quality improvement. Students will also participate in discussion related to health informatics applications. They will also investigate several topics of interest in the field and provide presentations.

First aid and physical Assessment

This course teaches students critical skills needed to respond to and manage first aid during emergency situation, particular emphasis given to emergencies related to cardiac issues. Students learn skills such as, how to manage bleeding, sprains, broken bones, shock and other first aid emergencies as well as **BLS-CPR** (Basic Life Support and Cardio-Pulmonary Resuscitation) and AED (Automated External Defibrillator). The CPR portion of the course teaches how to perform CPR on adults, children, and infants (including rescue breathing with a mask, a bag-mask device, and oxygen); how to use an AED in emergency; and rescue someone who is choking. They should understand the triage system in dealing with emergency to define imminent emergency

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situation to ascertain the priority in dealing with cases. Achieving certain competency, practical skills and passing written exam with good grades is required for certification.

☐ This course provides too, an introduction to physical health assessment in normal situations and promotion of health for all. Attention is given to the theoretical concepts of physical assessment techniques, interviewing skills, focused body system assessments, genetic and health risk assessments and to the key elements of the physiological, developmental, spiritual, socioeconomic, cultural, and aging dimensions essential for holistic assessment. Students are introduced to evidence-based basic clinical assessment tools. They should be able to spread knowledge in community regarding BLS-CPR and first aid.

Fundamental of Biostatistics

The purpose of this course is to familiarize students with the basics of biostatistics topics based on sources, scope, collection, classification, and presentation of descriptive data; Probability; Sampling; Inference; measures of population and vital statistics, Research with Statistical Package.

☐ The course will empower students to write statistical part of, data collection and statistical analysis plans for grants, enable to read most of the relevant health related literature with understanding of the statistical content, publications and to organize results in appropriate visual displays or tables.

☐ Hence forth, it revolves on the application of basic techniques as well as main concepts of inferential statistics.

Health Systems and Policies

Developing strategies and actions for strengthening health systems and enabling the health system to respond to public health needs and challenges is central to the mandate of public health profession. This course has been designed to deliver a conceptual and practical understanding of health system and health policy to students. The course provides the students with knowledge and competencies that enable students to undertake analysis of health systems and policies. This course introduces the core building blocks of health care systems and modes of operation, the implications of different approaches to health system design for health outcomes, access, and equity.

Introduction to Health Education and Promotion

The purpose of this course is considered the most enriched course with the basic topics necessary in health education and promotion programs, including the general idea of evidence-based health education and promotion will be outlined to create a general understanding of what planned and systematic health education and promotion, Also it aims to provide general knowledge about concepts, philosophy, principles, planning, evaluation ,communication& Communication skills , methods of Health education, health promotion health education concepts, Health Promotion competencies and health education, code of ethics approach(s) to the field after becoming familiar with the literature related to the discipline and engaging in a service-learning project.

Medical Terminology

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This course focuses on orienting the student to the in-depth knowledge of the medical terminologies for all body systems. The course provides the techniques of medical word building using basic word elements. It also gives the student a basic knowledge of medical terms used in the health profession. The format presents terminology within the context of root words and use of prefixes and suffixes. It is designed to stimulate the student thinking process including proper use and pronunciation of medical terms. The course creates understanding of the rules for using elements by combining them correctly to write medical terms. The course is divided into three main units:

Unit 1: Basic of medical terminology and body structure

Unit 2: Medical terminology related to disease and treatment and Diagnostic Tests.

Unit 3: Medical terminology related to individual body systems

Microbiology and Parasitology for Public Health

Course Description: The course is intended to provide introductory, fundamental and general concepts of microbiology. Classification will be assessed. The microbial cell structure, physiology, reproduction and identification of bacteria, viruses, fungi, and parasites will be discussed. The course will provide the principles of sterilization and disinfection, mechanisms of antimicrobial agents including commonly used antibiotic, infection control and preventive measures. The practical classes aim to demonstrate and provide students with the standard and basic microbiological techniques used in the isolation and identification of microbes, aseptic methodology, disinfection, antimicrobial testing, standard immunological methods, basic virus cultures, and serology.

Principles of Epidemiology

Epidemiology, one of the key disciplines in public health, is concerned with describing the patterns of diseases, identifying their causes and evaluating the effectiveness of health care and public health interventions. Such information helps to promote health and treat Disease. This course introduces the key elements of epidemiological methods. Include:

- ▶ Concepts and applications of epidemiology
- ▶ Population measures of health and disease
- ▶ Descriptive and analytical study designs
- ▶ Intervention studies
- ▶ Risk assessment and preventive strategies
- ▶ Surveillance and screening

The Students will have the opportunity to review and apply basic principles of epidemiology through assignments and activities selected case studies from the literature.

Disease Process

The course outlines basics of physiology and pathology of the human. The course includes the cause of infection, transmission of infection, chain of infection, basic understanding of pathology, types of pathology, handling with tissue samples (theoretically), and process of disease in human being. The course teaches the students the basics of body responses to various stimuli. It covers the understanding for process of inflammation, immunity, cell injuries, allergic responses and reactions, basic normal structure of cell and its response to different injuries. The course also covers diseases of blood and lymph nodes. Also define and discuss the main disease categories that may affect the body systems (endocrine, respiratory, cardiovascular, digestive, urinary, male and female reproductive systems, nervous, special senses and genetic disorders) as well as the

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basic mechanisms underlying these disorders (etiology, pathogenesis & natural history). The students will know the morphologic (gross & microscopic) changes occurring as a result of such disease processes in various organ systems. At the end the students determine the fate & complications of each particular disease and outline the general management procedures.

Applications in Health Informatics

This course traces the importance of the Electronic Health Record (EHR) and other clinical informatics applications in healthcare organizations such as clinical decision support, telehealth, patient portal, GIS and mHealth. This course helps the students to acquire knowledge about healthcare data set and standards of applications. This course also provides an opportunity for students to understand the key components and technologies involved in building applications. This course briefly covers patient monitoring and remote patient monitoring along with health information exchange and health care delivery system.

Fundamentals of Information Systems in Healthcare

This course aims to introduce students about the basic concepts and topics related to Information Systems (IS) in healthcare. It covers topics such as: health care information, types of health care information, systems concepts, subsystem concepts, system components, types of health care information systems, architecture of healthcare information systems, technologies that support health information systems, healthcare networks quality and security of information; It explores the concept and application of major information technologies and approaches in the delivery of modern health care systems. The focus in this course is on the processes of health information systems and how they interact for the safe and secure exchange of personal health information. Students will learn how data is collected, analyzed, processed and the role of data in decision making.

Introduction to Database

The database is designed to manage data. The Database field is concerned with the development of methodologies for designing a base of data, and with the development of computers for utilizing data from stored place. This course is designed to provide students database application and design skills through the use of Microsoft Access database software. This course emphasizes the concepts to plan, create, and revise a database system by introducing and working with objects of MS Access, and provides the student the tools to effectively utilize those objects within various environments.

Applied Biostatistics

- This course will develop the knowledge and technical skill and applications of statistical methods for the solution of problems related to Public Health through different type of statistical test and measurements, draw the statistical inference, conclusion, setup the hypothesis and research question.
- Students will enable to acquire the practical knowledge at hand and skill of different type of statistical software, M.S Office, Excel, SPSS and Sta Table.

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Health Records

This course focuses on orienting the students to the health information management and functions and duties of health record department. This course emphasizes on creating, structuring, organizing and maintaining health record in a Medical Record Department (MRD). The course provides an overview of documentation in Outpatient, nursing wards, Emergency and infection control department. The relationship of medical record to health care delivery system is discussed along with various formats of medical records used locally and globally. The course then shifts the focus to 'Computerization of Health records' highlighting the need to implement electronic record systems and the phases required to do so. Students will also explore principles of information management like records disposition, principles and procedure used in health record organization, maintenance and retention, filing system, form control and design, and imaging. Professional standards in filing, naming, numbering, and the merits and demerits of each systems of record keeping are discussed. Legal aspect related to collection, relation and sharing of patient data, Doctor –patient confidentiality and ethical behavior will also be covered.

Organizational Behavior in Health care

This is a core management course which examines the interrelationship of behavioral phenomena at various levels and provides a basic understanding of owns own and others' behavior in places of work. The course intends to enhance the ability to communicate and work effectively with others and strengthen the people management skills. The broad areas which are covered in this course include individual and group dynamics encompassing communicating, team building, power and influence, decision making, conflict, motivation, stress management and a host of other issues that drive the effectiveness and ultimately the performance of organizations. In addition, the course features managing change and overcoming resistance to change; and equipping employees to work in changed environments.

Health Data Classification and Coding Systems

This course introduces the updated classification of health data coding, keeping in reference the international standards of updated international classification system approved by WHO. In addition, Current Procedural Terminologies, Correct Coding Initiative, reimbursement processes for hospital and insurance companies and ethical issues in coding and classification are also the part of this course. Students learn about the basic principles of coding healthcare data by using ICD 10CM, and understand the application of updated coding scheme including coding guidelines. The students will be familiarized with the Super bill and CMS 1500 form which are commonly used in Healthcare for Reimbursement. It also outlines how to use ICD Manuals and CPT Manual for diseases and procedures respectively. This course also describes briefly about medical insurance and the procedure of reimbursement.

Fundamental of Programming-1

This course aims to inspire the innovative ability of the student. This course emphasizes on creating web pages and develops computer program. The course provides the basic information about Web Technology and a fundamental understanding of HTML. Students will learn how to draw flow chart for a simple and complex problem and can solve problems using algorithms. The

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course provides a scope for developing a webpage using HTML and programs using C programming. This course helps the student in developing logical thinking and problem solving techniques.

Database Management Systems

An in-depth introduction to the database management system (DBMS), with an emphasis on how to design a database, and use DBMS efficiently. Topics include basic functions and capabilities of database management systems (DBMS), data models, Functional dependencies, normal forms, relation algebra, data modeling, design of normalized relational database, using structure query language (SQL), storing data which includes the memory hierarchy, RAID, disk space management, and data protection. Moreover, some advanced topics will be discussed like: object oriented database and distributed data bases. Emphasis is placed on the use of DBMS in solving information processing problems which will include database design case studies as well as SQL programming assignments. Students will be trained on some software tools such as: Oracle 10g. A class project may be assigned to each team. The students will be familiarized with the concepts of a DBMS and how it is used in information systems, able to identify the information and processing needs of the organization, and to produce an entity-relationship model for a simple system from system analysis. The students will be trained to develop and implement the database system in an organization.

Research Methodology

This course provides basic idea of research, its significance and principles. It describes different approaches to research designs and familiarizes students to different methods for planning and conducting scientific research. This course describes methods for planning and conducting scientific research. It includes identifying the research problem, formulating the research question, setting research objectives, designing the study, identifying methods of data collection, statistical analysis, interpretation and dissemination of the results. The course also introduces principles of research ethics to students.

Sociology of Health and Illness

This course reviews the sociology of health and illness, with a focus on understanding the complex relationships that exist between social factors (e.g., social class, gender, race, ethnicity, age, etc.) and health. It discusses the origins of scientific medicine and analyzes disease and illness in present-day society. It also examines the role of health care providers, and discusses factors shaping health care systems and policies and equips students to incorporate social perspectives in their professional arena.

Health Economics

Health economics is a growing field and is an important aspect of public policy in developed and developing countries. Health economics, relatively a young discipline, is a branch of economics concerned with issues related to scarcity in the allocation of health and health care. It aims at improving the health status of people with effective and efficient allocation and utilization of resources. Health economics play an important role in making health systems more effective, efficient, and equitable. This course provides the foundations for participants to better

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understand health economics and its potential contribution to decision making in the health sector. The purpose of this course is to encourage students to read, understand, think, and do research on issues in health economics with special reference to developing countries and to demonstrate their potential application for better healthcare.

Fundamentals of Programming 2

This course programming is introduced using python, a popular, powerful open- source and easy to use programming language. This is an introductory course designed for any student interested in using computation to enhance their problem-solving abilities. Students will use their problem-solving abilities to implement basic programs in Python. This course covers fundamental computational problem-solving concepts, tools and methodologies. Students will learn how to select an appropriate data type and apply the most appropriate technical processes for a given computational problem and can apply in many scientific areas.

Health Systems Analysis and Design

A major goal of this course is to give the opportunity to apply the knowledge of systems planning, analysis and design insights to a healthcare information systems problem. This course addresses methods and techniques of healthcare information system (IS) analysis and design as performed within the system development life cycle. The course covers the important concepts and theories of systems analysis and design, organizational structure, human computer interaction, and information processing, role of information systems analyst in an organization, structured analysis and modelling techniques, object-oriented analysis, and design. It also consists of techniques for problem definition, requirements gathering, analysis, logical design, selection, and evaluation of alternative healthcare information systems solutions from the point of view of the health provider and user. In Practical approach this course exposes students in designing the Website with their own creativity and ideas by using special tools such as WIX.com and processes of information management with Health care objectives.

Health Research Design

This course is basically a practical based course for handholding students in designing health related research plan. It describes methods for planning and conducting scientific research. It includes practically identifying the research problems, formulating the research questions, setting research objectives, designing the study, sampling techniques, calculation of sample size and identifying methods of data collection. It is first step towards completion of graduation project planned for next level.

Healthcare Quality and Patient Safety

Quality concerns with every product or service a consumer seeks. Primary mission of most organizations in healthcare is to deliver quality services. This course aims to introduce to the students' basic quality improvement strategies and concepts of patient safety which is one of the core sections in maintaining and improving quality. Various models of quality improvement have been discussed, in addition with the mechanisms and tools used in the same. The course includes quality and performance improvement, patient safety and data analytics. Course outlines

successful quality practices in healthcare and methods to achieve quality service delivery such as quality planning, improvement, assurance and control. Students will also study the importance of quality and its relation to patient safety. Students will learn about key performance measures of quality, how to measure them and interpret the data trends. Implications of medical errors and Errors reporting systems have been discussed in the course. Performing root cause analysis and prospective precautionary measures are highlighted as well. Performance improvement by improving structure, process and outcomes of healthcare organizations is widely covered.

Hospital Statistics

This course covers maintenance, compilation, analysis, and presentation of healthcare statistics and research protocols and techniques. Topics include basic statistical principles, indices, databases, registries, vital statistics, non parametric test, research protocol monitoring, Institutional Review Board processes, and knowledge-based research techniques. Upon completion, students should be able to apply, interpret, and present healthcare statistics and utilize research techniques to gather and interpret healthcare data. The course introduces the student to basic statistical principles and calculations as applied in Hospitals..

Data Management and Visualization

This course aims to develop an understanding of the management and structuring of large datasets. This course will also develop an understanding of critical role of data quality and data governance. Techniques for data visualization, particularly of large datasets, will be investigated. Topics in data management include OLAP concepts, data warehousing, data mining, and ETL (extract, transform, load) processing, pre-processing, decision trees and metadata management. Topics in data visualization include understanding data types; forms of data visualization to include heat maps and info graphs; and best practices for usable, consumable, and actionable data/results presentation. Students will also be trained on some well-known data mining software such as WEKA and Tableau.

Human Computer Interaction

In this course, students are introduced to the fundamental theories and concepts of human-computer interaction (HCI). HCI is an interdisciplinary field that integrates theories and methodologies across many domains including cognitive psychology, neurocognitive engineering, computer science, human factors, and engineering design. Students will gain theoretical knowledge of and practical experience in the fundamental aspects of human perception, cognition, and learning as relates to the design, implementation, and evaluation of interfaces.

Overall, this course covers three broad categories of topics within human-computer interaction: (a) the principles and characteristics of the interaction between humans and computers; (b) the techniques for designing and evaluating user-centered systems; and (c) current areas of cutting-edge research and development in human-computer interaction.

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Topics covered include: interface design, usability evaluation, universal design, multimodal interfaces (touch, Heuristic Evaluation, vision, natural language and 3-D audio), virtual reality, and spatial displays. In addition to lectures, students will work on individual and team assignments to design, implement, and evaluate various interactive systems and user interfaces based on knowledge culled from class material and additional research.

Legal and Ethical Aspects of Health Informatics

This course introduces the study of legal and ethical principles related to patient care and health information (including Health Records); legal terminology and procedures; court systems; and liability of health care providers. Legal requirements governing policies designed to safeguard and maintain health information, including how to appropriately respond to requests for patient-specific information will be explored. Students will explore ethical issues and apply a decision-making model to selected case studies. The course also focuses on legal liability involved in unauthorized access, disclosure, abuse of health data following Saudi Law and ethical considerations in reference with AHIMA's code of ethics and HIPAA's privacy rule. In addition, students will learn about statutory requirements involved in maintaining medical information and methods to protect the data, and steps to resolve ethical conflicts.

Trends In Health Informatics

This course will expose students to the latest topics in health informatics and the emerging technical solutions that can help improve healthcare delivery and health decision-making not only for clinicians but also for patients and general health consumers. The lectures and tutorials will include but not limited to the following topics: personalized medicine, mobile phone apps and IoT, precision medicine, artificial intelligence in healthcare, citizen science, big data, robotics, augmented reality, genomics, nanomedicine etc. Along with these seminars, students will receive a set of relevant readings from scientific journals associated with each of the seminars for analysis and interpretation. Students will also present their findings. This course provides a bridge between the didactic health informatics coursework and the capstone experience. This course will also examine trends impacting the health informatics field and their impact on the structure, behavior, and interactions of natural and artificial systems that store, process and communicate information.

Elective Courses

417 HSM Financial Accounting in Healthcare

The course introduces the students to the principles of financial accounting and provides an insight into the concepts and uses of financial accounting information in context of a business environment. The course implies the importance of financial management for the overall benefits of any organization and its role in the economic decision-making process. Primary areas of study include the theories of debits and credits, accounting journals, the accounting cycle, notes and interest, receivables and payables, accruals and deferrals, measurement and valuation of assets and liabilities (appreciation and depreciation), the determination of net profit and the preparation and analysis of basic financial statements (balance sheets). Related topics covered

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include computation of diluted earnings per share, disclosure issues, earnings management, and basic financial statement analysis of cash flows. By the end, the course aims to provide the students a foundation for developing their skills in interpreting financial statements.

434 BHI Mobile Computing in Healthcare

Mobile computing is the set of IT technologies, products, services, and operational strategies and procedures that enable end users to gain access to computation, information, and related resources and capabilities while mobile. Mobile most commonly refers to access in motion and is therefore unrestricted to a given geographic location. Mobile may also, however, refer to access in a fixed location via equipment that users can relocate as required, but is stationary while in operation. This mode of operation is often called nomadic computing. The applications of mobile computing today have become ubiquitous and pervasive in business, consumer, industrial, entertainment and many specialized vertical-market activities.

438 BHI Network and Cybersecurity

The course outlines the current practices and developments of the computer network security system in the field of Health. It covers the TCP/IP architecture and other various models to achieve provision of better quality healthcare services. The course provides an outline of using techniques like firewalls to adopt the security concept in health care organization. This course allows students to delve further into the field of computer security. Students will study many different attack techniques with an emphasis on the defense against these attacks. Topics include applied networking, features of various network systems, attacks and defenses, methods for network reconnaissance and scanning, network attacks against confidentiality and integrity, denial of service attacks, and secure network architecture.

439 BHI Geographic Information Systems for Public Health

This course covers applications of Geographic Information Systems (GIS) in public health and describes how these tools can be used to explore connections between people, their dynamic physical and social environments, and their health. The materials covered will provide an introduction to geographic methods, GIS tools and a unique framework from which to understand health outcomes and develop public health strategies to reduce disease and improve the public's health. More specifically it will provide an introduction to basic GIS concepts and an overview of the most common geographic methods utilized in public health and epidemiology for mapping and analyzing geographic variation in health events, health disparities, risk factors, and health services.


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