

## **Faculty of Natural & Health Sciences Health Informatics Department**

### **Program Overview**

dynamic field Health Informatics is a discipline at the intersection of information science, computer science, social science, behavioral science and healthcare. It deals with resources, devices, and methods required to optimize the acquisition, storage, retrieval, and use of information in health biomedicine. Health informatics tools include computers, clinical guidelines, formal medical terminologies, and information and communication systems.

It can be applied to the areas of nursing, clinical care, dentistry, pharmacy, public health, occupational therapy, physical therapy, (bio)medical research and alternative medicine.

The Health Informatics B.Sc. degree program is designed to efficiently provide training in Health Informatics. The program delivers academic and practical training in informatics to students who want to become a health informatics. Health informatics is one of the fastest growing career fields. By combining their skills in public health and information, health informatics professionals can undertake many unique and important roles.

1- Graduates may lead visioning and strategy for new ways of leveraging information to promote the improvement of individual health behaviors.

2- Graduates may lead the development of applications or systems that improve the ways consumers and clinicians access and use information.

3- Graduates may find roles as application designers and developers, consultants, system analysts, and entrepreneurs.

4- Graduates can become quality improvement analysts, data miners, evaluation specialists, or clinical and public health researchers.

5- Graduates can be part of a new generation of informatics-enabled policy analysts and engage with ongoing health reform.

6- Graduates will be able to assume positions as medical, or public health information or technology officers who envision new solutions to health care and delivery

Graduates will work in a wide range of settings and roles within them. Their activities will reflect the positioning of this program to prepare leaders at the forefront of a

## Requirements

The student has to pass at (128) credit hours to get a B. Sc. Degree in Health Informatics as follows:

Description		Credit Hours
University Requirements		17
Faculty Requirements		21
Department Requirements	<i>Obligatory</i>	75
	<i>Elective</i>	9
	<b>Total</b>	<b>84</b>
Free Electives		6
<b>Total</b>		<b>128</b>

### 1. University Requirements

Students must pass (17) credit hours as follows:

Course #	Course Name	Contact Hours		Cr. Hrs	Prerequisite/s
		Theoretical	Lab		
UR00101	مهارات اللغة العربية	3	-	3	-
UR00111	مهارات اللغة الانجليزية (1)	3	-	3	-
UR00112	مهارات اللغة الانجليزية (2)	3	-	3	UR00111
UR00121	فكر وحضارة	3	-	3	-
UR00122	تاريخ فلسطين	3	-	3	-
UR00131	مهارات الحاسوب	1	-	1	-
UR00141	مهارات القيادة والاتصال	1	-	1	-
<b>Total</b>				<b>17</b>	

### 2. Faculty Requirements:

Students must pass (21) credit hours as follows:

Course #	Course Name	Contact Hours		Cr. Hrs	Prerequisite/s
		Theoretical	Lab		
NHFR113	General Chemistry	3	3	4	-
NHFR111	General Biology	3	3	4	-
NHFR115	General Physics	3	3	4	-
NHFR121	Organic Chemistry	3	3	4	NHFR113
NHFR328	Biostatistics	3	-	3	-
NHFR218	Epidemiology and Public Health	2	-	2	-
<b>Total</b>				<b>21</b>	

## Departmental Requirements

Students must pass (84) credit hours as follows:

**1) Obligatory Courses:** students must pass (75) credit hours as follows:

Course #	Course Name	Weekly Hours		Cr. Hrs	Prerequisite
		Theoretical	Practical		
NHHI111	Introduction to Health Informatics	3	-	3	
NHHI 112	Electronic Health Records	3	-	3	
NHHI 113	Principles of Management	3	-	3	
NHHI 211	Anatomy and Physiology I	3	-	3	Biology, Medical terms
NHHI 213	Health Policy and Healthcare system	3	-	3	NHHI111
NHHI 214	Organizational Behaviour and Management in Healthcare	3	-	3	NHHI 113
NHHI 215	Biostatistics and Epidemiology	3	-	3	Math
NHHI 220	Introduction to Data Base	2	3	3	NHHI 101
NHHI 221	Computer Programing I	2	3	3	NHHI 220
NHHI 222	Computer Programing II	2	3	3	NHHI 221
NHHI 223	Medical Coding and Billing	3	-	3	NHHI111
NHHI 321	Concepts of Health Education and Promotion	3	-	3	
NHHI 322	Financial Management for Healthcare	3	-	3	NHHI 113
NHHI 331	Computer Networks	2	3	3	NHHI 222
NHHI 332	Web Technologies	2	3	3	NHHI 222
NHHI 323	Healthcare Research Methods and Analysis	3	-	3	
NHHI 324	Health Communications	3	-	3	
NHHI 310	Human Computer Interaction	3	-	3	
NHHI 311	Global Health	3	-	3	NHHI 215
NHHI 330	System Analysis and Design	2	3	3	NHHI 331
NHHI 410	IT Security and Policies	3	-	3	NHHI 331
NHHI 411	Law , Policy and Ethics in health Informatics	3	-	3	NHHI 322
NHHI 421	Public Health Informatics	3	-	3	NHHI111
NHHI 422	Community Health Information and information exchange	3	-	3	NHHI111
NHHI 430	Graduation Project in Health Informatics	3	0	3	NHHI 323

**2) Elective Courses:** students must pass (9) credit hours from the following courses:

Course #	Course Name	Weekly Hours		Cr. Hrs	Prerequisite
		Theoretical	Practical		
NHHI 315	Telehealth and Telemedicine	3	-	3	NHHI 332
NHHI 441	Multimedia Systems Development	2	3	3	NHHI 222
NHHI 445	Decision Support systems	3	-	3	-
NHHI 446	Data Mining Data Warehousing	2	3	3	NHHI 330
NHHI 448	Mobile Application Development	2	3	3	NHHI 331
	Total	15			

## Faculty of Applied Science and Health Health Informatics Department

### 1<sup>st</sup> Year

1 <sup>st</sup> semester			2 <sup>nd</sup> semester		
Course #	Course Name	Cr. Hrs	Course #	Course Name	Cr. Hrs
NHFM111	General Biology	4	NHFM121	Organic Chemistry	4
UR00111	مهارات اللغة الانجليزية I (UR)	3	NHFM115	General Physics	4
NHFM113	General Chemistry	4	NHHI 112	Electronic Health Records	3
NHHI111	Introduction to Health Informatics	3	NHHI 113	Principles of Management	3
NHFM328	Biostatistics	3	NHFM218	Epidemiology and Public Health	2
			UR00131	مهارات الحاسوب (UR)	1
			UR00141	مهارات القيادة والاتصال (UR)	1
	<b>Total</b>	<b>17</b>		<b>Total</b>	<b>18</b>

### 2<sup>nd</sup> Year

1 <sup>st</sup> semester			2 <sup>nd</sup> semester		
Course #	Course Name	Cr. Hrs	Course #	Course Name	Cr. Hrs
NHHI 211	Anatomy and Physiology I	3	NHHI 214	Organizational Behaviour and Management in Healthcare	3
NHHI 213	Health Policy and Healthcare system	3	NHHI 222	Computer Programing II	3
NHHI 221	Computer Programing I	3	UR00101	مهارات اللغة العربية	3
NHHI 215	Biostatistics and Epidemiology	3	NHHI 223	Medical Coding and Billing	3
NHHI 220	Introduction to Data Base	3	NHHI 321	Concepts of Health Education and Promotion	3
UR00112	مهارات اللغة الانجليزية I (UR)	3		Free Elective	3
	<b>Total</b>	<b>18</b>		<b>Total</b>	<b>18</b>

*3<sup>rd</sup> Year*

1 <sup>st</sup> semester			2 <sup>nd</sup> semester		
Course #	Course Name	Cr. Hrs	Course #	Course Name	Cr. Hrs
NHHI 322	Financial Management for Healthcare	3	NHHI 315	Telehealth and Telemedicine	3
NHHI 331	Computer Networks	3	NHHI 310	Human Computer Interaction	3
NHHI 332	Web Technologies	3	NHHI 311	Global Health	3
NHHI 324	Health Communications	3	NHHI 330	System Analysis and Design	3
UR00121	فكر وحضارة (UR)	3	UR00122	تاريخ فلسطين (UR)	3
NHHI 323	Healthcare Research Methods and Analysis	3			
	<b>Total</b>	<b>18</b>		<b>Total</b>	<b>15</b>

*4<sup>th</sup> Year*

1 <sup>st</sup> semester			2 <sup>nd</sup> semester		
Course #	Course Name	Cr. Hrs	Course #	Course Name	Cr. Hrs
NHHI 410	IT Security and Policies	3	NHHI 448	Mobile Application Development	3
NHHI 411	Law , Policy and Ethics in health Informatics	3	NHHI 430	Graduation Project in Health Informatics	3
NHHI 421	Public Health Informatics	3			
NHHI 422	Community Health Information and information exchange	3			
NHHI 441	Multimedia Systems Development	3			
	<b>Free Elective</b>	<b>3</b>			
	<b>Total</b>	<b>18</b>		<b>Total</b>	<b>6</b>

## **DESCRIPTION OF COURSES OFFERED BY THE DEPARTMENT OF ENVIRONMENTAL & COMMUNITY HEALTH**

### **NHHI 111: Introduction to Health informatics**

This course is designed to provide students with the knowledge and skills of Health Informatics. Students will learn how data, information and knowledge are created, managed and processed using Information and Communication Technology. This course will introduce the students to Health Informatics as a Discipline, Basics of Electronic Health Records, Computerized Physician Order Entry, Medical databases, Imaging, Tele-health, Consumer Health Informatics and Ethics in Health Informatics. The course will also cover the standards and ethical issues including HIPAA legislations. It also provides a historical perspectives of computing in health.

### **NHHI 112: Electronic Health Records**

This course will introduce the students about the history of Electronic Health Record and its development for the past 40 years. Students will appreciate why and how EHR should replace paper-based health record. Students will learn the technical components to design and build EHR as well as the management and social aspects of EHR.

### **NHHI 113: Principles of Management**

This course combines management theory and practices, placing emphasis on the development and application of competencies required for effective leadership, including planning, motivating, organizational control, change management, and decision-making, using current domestic and global business issues in the context of ethical, team centred organizations. The course includes practice in conflict resolution and mediation, fostering improvement of working relationships, through the use of activities that integrate emotional intelligence and communication skills that help created a productive work environment.

### **NHHI 211: Anatomy and Physiology I**

Anatomy and Physiology is an intensive two part course. Both courses are the basic requirement for the Health Informatics specially preparing students and arming them with fundamental and basic concepts and terminology for a career in Health Informatics. Anatomy and Physiology I is designed to prepare students for the challenges of a career in a health related field. The primary focus is on learning the gross anatomy of human organ systems. Students are immersed in learning histology and complex inter-workings of network physiology, pathology and

pharmacology. The course aims to provide an understanding of the techniques and tools to analyze anatomical structure & functions.

### **NHHI 213: Health Policy & Healthcare System**

This course presents an overview of health policy making and describes healthcare policy with specific examples from types of health systems. Special emphasis is placed on the power and process of the health policymaking arena.

### **NHHI 214: Organizational Behavior and Management in Healthcare**

Effective management of human resources within healthcare organizations requires an understanding of various organizational behaviors and processes. With a better understanding of behavioral processes in terms of individuals' perceptions, motivations, and attitudes, it will enable managers to understand themselves better, and also adopt appropriate managerial policies and leadership styles to increase their effectiveness. The aim of this course is to explain the way people behave and why they behave in a such way in the organizational setting. This course focuses on the organizational processes and theoretical constructs related to organizational behavior. The roles of leaders, followers, and teams and their influence on the culture and performance of an organization are addressed through the analysis of key organizational behavior concepts and related cases..

### **NHHI 215: Biostatistics & Epidemiology**

The purpose of this course is to learn how to apply statistical methods to the biomedical sciences. This course will help the students to be able to understand and interpret uncertainty and behavior of diseases. The course will also include a brief introduction to epidemiology, the study of the distribution and determinants of diseases in human populations to support students' ongoing education in the health informatics field. In completion of this course, students should be able to comprehend statistical procedures, choose the most appropriate procedure in a given situation, carry out the chosen procedure and analyze/interpret statistical results.

### **NHHI 220: Introduction to Database**

The course familiarizes students with significance of maintaining a computer based database using DBMS and its potential advantages to the organization. The students at the completion of this course will be able to understand the principal database concepts and develop a simple database for a small organization using standard DBMS. In this course, students should study the following topics: Basic concepts in database systems and architectures; Entity-Relationship model, Data models (including basics of Relational model & SQL), Database Design (Database dependencies and Normalization), and Database implementation.

### **NHHI 221: Computer Programming I**

This course is to introduce the students to the principles of computer analysis of problems, design of algorithms, programming and testing using the Java programming language. Topics include problem analysis, basics of Programming, data types, control structures, functions, arrays, and the mechanics of running, testing, and debugging.

### **NHHI 222: Computer Programming II**

This course is the logical extension of Computer programming 1. In this course, students will be taught to work on complex data structures and algorithms. Major focus of this course is to prepare the transition from conventional functional programming to more relevant object oriented programming. Topic includes Concepts of object oriented (OO) programming: data abstraction, encapsulation, inheritance, and polymorphism. Also includes key data structures including stacks, queues, linked lists, binary trees, recursion and examples using some fundamental algorithms of computer science. Java programming languages will be used.

### **NHHI 223: Medical Coding and Billing**

This course introduce the students to different clinical coding/classification and nomenclature systems such as SNOMED, CPT, HCPS and ICD-O and the essential coding concepts and phases. The course is enhanced by practical exercises to strength students' understanding of different steps for accurately select and use different coding system based on coding purpose. The course emphasis on applying those concepts to medical billing and explains the different stages for proper diagnostic and procedural coding and forms preparation for billing or reporting to the health insurance provider.

### **NHHI 321: Concepts of Health Education and Promotion**

This course enhances the student's awareness about the factors that influence health such as; heredity, environment, health care services, and our own behavior. It critically evaluates student's understanding and attitudes towards health education and promotion. It develops personally and professionally skills through participative and experiential learning; and through empowerment. It helps the students who would become health educators or health promoters to enhance the pedagogy and practical skills of teachers in the context of revised curricula and develop new approaches to evaluation and assessment strategies and to become effective facilitators of learning. It also provides the students with knowledge and practice of integrating technology with health promotion practice.

### **NHHI 322: Financial Management for Healthcare**



This course provides an overview of financial management of healthcare organizations. Students will learn basic concepts of financial management as well as the role that finance plays in the healthcare organization today. Focus will be on the role of financial manager, financial statement cash management and budgeting, financial ratios and working capital, cost of capital, the concept of time value of money.

### **NHHI 331: Computer Networks**

This course consists of fundamental concepts in the design and implementation of computer communication networks and their protocols. This course provides students with hands on experience in most state of the art networking tools, technologies, standards and protocols. This includes layered network architectures, applications, transport, congestion, routing, data link protocols, local area networks. An emphasis will be placed on the protocols used in the Internet.

### **NHHI 332: Web Technologies**

In this course students will be familiarized with web application development including client side as well as server side development and database connectivity. Topics such as Introduction to the Internet, World Wide Web, World Wide Web Consortium (W3C), standard mark-up language and services of the Internet. Topics include creating web pages, search engines, FTP, and other related topics. Students will get descriptions of client side and server side programming. Upon completion, students should be able to deploy a hand-coded web site created with mark-up language, and effectively use and understand the function of search engines.

### **NHHI 323: Healthcare Research Methods and Analysis**

This course provides demonstration on basic skills for health informatics research conduct. Students will learn how to conduct research using a variety of sources (primary, secondary and general). Students will be instructed on proposal writing techniques (development of a thesis statement, aims, objectives, selection of appropriate methods, methodology, etc...). Students will learn of quantitative and qualitative data collection and analysis approaches, and how to evaluate reliability and validity. Students will perform data collection and analysis, reporting their findings using formal scientific writing.

### **PHC 311 Global Health**

The course will provide students with an introduction to the global burden of disease and the relationships between globalization and health, including recent global health issues such as climate change. Offering a multidisciplinary perspective, the course will examine global epidemics/pandemics, global mobility

(tourism and population migration – refugees) and inequalities. The diversity of health care systems is considered and lessons will be derived, in order to develop an understanding of health system requirements globally.

### **NHHI 324: Health Communications**

This course is designed to familiarize students with theory and research on communication in health and illness contexts, focusing on how messages from interpersonal, organizational, cultural and media sources affect health beliefs and behaviors. The course will explore communication in health care delivery, health care organizations, as well as health promotion and disease prevention. Spanning multiple levels of communication, different communicative channels, and the use of diverse communication media and technologies, this course will demonstrate a variety of perspectives from which the students examine health communication at an individual, family, professional, organizational and societal level.

### **NHHI 310: Human Computer Interaction**

The course provides an overview about the fundamental components of an interactive system which include the human, the computer system itself and the nature of the interaction. It presents also different interaction models, frameworks and styles. Moreover, it includes the interaction design process and highlights the range of design rules that can help to increase the usability of software products. In addition, it includes the evaluation techniques under two broad headings: expert analysis and user participation.

### **NHHI 330: System Analysis and Design**

The course is designed to integrate theoretical concepts of system analysis and design with practical examples and case studies so as to teach both the theory and the practice of this subject. In this course students will understand about practical techniques of software requirements, analysis, design, architecture and associate concepts. The object-oriented software industry over the last few years has gone through the process of standardizing visual modeling notations. The students will get familiarity with UML, Unified Modeling language, a modeling language for specifying, visualizing, constructing, and documenting, is the product of this effort. UML unifies the notations that currently exist in the industry.

### **NHHI 410: IT Security and Policies**

This course introduces the concepts and issues related to securing information systems and the development of policies to implement information security controls. Topics include the historical view of networking and security, security issues, trends, security resources, and the role of policy, people, and processes in

information security. Upon completion, students should be able to identify information security risks, create an information security policy, and identify processes to implement and enforce policy.

### **NHHI 421: Public Health Informatics**

This course is designed to provide students with the knowledge required to develop, implement and evaluate public health information systems, and the knowledge about the application of information technology to public health practice, research and learning. The course will introduce public health disease surveillance systems (including their interaction with Electronic health records), public health practice support systems, public health disaster and emergency systems, health consumers' informatics for disease self-management and prevention.

### **NHHI 411: Law, Policy and Ethics in Health Informatics**

This course explores the laws, policies, and issues involved in oversight and management of health data and health information systems. It also defines the legal health record and requirements, role, and uses, Covers the legal and ethical framework, issues and concepts and the role of e-discovery on the emerging health data environment.

### **NHHI 422: Community Health Information and Information Exchange**

This course includes community and consumer health informatics associated with health services provided; electronic health records that address internal and external standards; accreditation and regulatory requirements needed to provide quality care; and health information exchange from policy to implementation.

### **NHHI 430: Graduation Project in Health Informatics**

This course is mainly designed to prepare students with the knowledge to be IT project managers with project management skills needed to better manage IT projects. Built along the IT project management lifecycle, this course covers detailed topics of the basic concepts of IT project management, including initiating, planning, controlling, executing, and closing projects. The course also shows how IT projects should be managed, from inception to post implementation review. This course will help improve management skills and abilities to define the project scope, create a workable project plan, and manage within the budget and schedule.

### **NHHI 315: Telehealth and Telemedicine:**

This course introduces definitions and concepts relating to the use of telehealth in clinical and non-clinical health services. A range of clinical and non-clinical

telehealth applications will be explored using case examples, while introducing relevant guidelines and technical standards.

**NHHI 441: Multimedia Systems Development:**

In this course, students will be introduced to principles and current technologies of multimedia systems, multimedia standards, and gain hands-on experience in this area. Issues in effectively representing, processing, and retrieving multimedia data such as sound and music, graphics, image and video will be addressed. Major topics include multimedia application design, data processing and presentation, compression and decompression standards and content based multimedia retrieval.

**NHHI 445: Decision Support Systems:**

The course is devoted to introduce decision support systems; show their relationship to other computer-based information systems, demonstrate DSS development approaches, and show students how to utilize DSS capacities to support different types of decisions. The topics covered in the course include but not limited to Introduction to decision support systems; DSS components; Decision making and DSS; DSS software and hardware; developing DSS; DSS models.

**NHHI 446: Data Mining and Data Warehousing:**

This course will familiarize the students with the techniques most commonly employed in the analysis of large volumes of data, in the extraction of knowledge from this data, and in making decisions based on the knowledge acquired. Students will also gain knowledge about the problems related to data mining that are not yet resolved satisfactorily at present and, therefore, are open research areas so that students can potentially work on those and find niche in this area of expertise. Major areas of data mining covered in this course include Data mining architectures, Data Integration, Data Warehousing, Data classification, Regression, Clustering, Correlation and several others.

**NHHI 448: Mobile Application Development:**

This course is aimed at providing students with basic and fundamental knowledge concept of mobile computing. This includes the major techniques involved, and networks & systems issues for the design and implementation of mobile computing systems and applications. This course also provides an opportunity for students to understand the key components and technologies involved and to gain hands-on experiences in building mobile applications. Students will gain knowledge about mobile IP, mobility management, location estimation, location-aware computing, user experience and other topics