جامعة الفيصل
Alfaisal University

Graduate Catalog

Programs, Curricula & Study plans

2016-2017

Office of Research & Graduate Studies

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1. Introduction

This section of the Graduate Catalogue presents current graduate programs, courses & study plans. It has been prepared by the Office of Research & Graduate Studies in coordination with the Graduate Program Directors and Co-Directors in each College. Course acronyms and codes have been standardized for easier reference. For example, one acronym for each graduate program, irrespective of the number of tracks within that program. All graduate programs and their tracks, if any, are first listed in alphabetical order; followed by course listings, course descriptions and study plans. The catalog is updated on a yearly basis.

2. Graduate Programs

Alfaisal University currently offers seven graduate programs. The programs and their tracks, if applicable, are:

2.1 Master Degree in Business Administration (MBA)

In addition to the general MBA, MBA tracks in Healthcare Management and in Finance are designed to meet specific needs in the KSA business & health communities. These tracks are not separate MBA programmes; they are made up of the standard eight core courses plus, at least, five elective courses

2.1.1 *General:* The Alfaisal University College of Business MBA degree provides students with the theoretical knowledge and practical skills needed to take advantage of career opportunities and to deal effectively and responsibly with complex business challenges. Global and regional organizations require their managers and leaders to have a variety of technical and interpersonal skills. The Alfaisal University MBA will equip students with the skills and qualification needed to realize these objectives and better serve your organization, your community, and your nation.

2.1.2 *Finance:* The MBA Finance track is taught by the College of Business at Alfaisal University. It builds on the established strengths of Alfaisal's core MBA program and its strong Finance and Economics faculty. It also exploits the intellectual ties between Finance, Accounting, and Economics. The program focusses on applied finance and is highly relevant to the various contemporary finance issues. It is flexible as it affords students the opportunity to select from a variety of finance elective courses that allow them to fit the MBA-Finance experience to their specific career needs.

2.1.3 *Healthcare Management:* The MBA Healthcare Management track is taught jointly by the College of Business and the College of Medicine faculty at Alfaisal University. It builds on the established strengths of Alfaisal's core MBA program and its solid presence in

medical education. The program is highly relevant to clinical and non-clinical medical professionals looking to enter the ranks of management or those who are already health care managers wishing to improve their skills. Using an integrated world-class curriculum, students receive a very pertinent and timely education in the management of healthcare operations.

2.2 Master Degree in Biomedical Sciences (MBS)

The Ministry of Education (MOE) approved two year Graduate Program which is open to both male and female students, Saudi and non-Saudi, allows students to choose to join one of five tracks. All tracks are Thesis Option.

2.2.1. *Analytical Biochemistry:* The program aim is to provide graduates with an understanding of fundamental biological processes at a molecular level; it also contributes to solving of medical problems and drug discovery and disease curing.

2.2.2. *Biotechnology:* The program includes courses dealing with the advanced techniques of molecular biology, genetic engineering, applications of nanotechnology, and special topics such as nanomedicine and its applications in disease diagnosis, drug formulation, and drug delivery.

2.2.3. *Clinical Embryology & Reproductive Biology:* Graduates will be prepared to meet the rising need in the Kingdom of Saudi Arabia and the Gulf region for qualified and well-trained assisted reproductive technology (ART) professionals. Certified by Saudi Commission for Health Specialties (SCHS)

2.2.4. *Infection Control:* Graduates from this program which meets international standards will have achieved the competencies for developing and leading infection prevention programs in healthcare facilities. Certified by Saudi Commission for Health Specialties (SCHS)

2.2.5. *Molecular & Cell Biology:* The Graduate Program offers a unique environment of higher education that integrates the research and training capabilities at KFSHRC and Alfaisal University in a distinctive modern educational setting. Potential careers for graduates include the expanding market in molecular medicine, biotechnology, and biomedical research.

2.3 Master Degree in Engineering & Systems Management (MEM)

The Ministry of Education (MOE) approved two year M. Sc. in Engineering & Systems Management consists of both thesis and courses-only options. The program was developed in collaboration with the Centre for Complex Engineering Systems (CCES) at KACST (King Abdulaziz City for Science & Technology) and MIT (Massachusetts Institute of Technology). The elective courses span the themes: *Decision Analysis & Data Analytics*, *Manufacturing & Supply Chain Management*, and *Development of Cyber-Physical Systems*. This program is not an MBA; it is a technical master's degree focused on engineering, data science and computation. "Systems thinking" is an important part of the degree, whether applied to the

improvement of existing systems and operations or the creation of new products and services. Personal engineering leadership development is a mandatory part of the program.

2.4 Master Degree in Genetic Counselling (MGC)

The goal of this courses-only program is to meet the current and future demand of healthcare system for highly qualified, competent and culturally sensitive genetic counsellors in Saudi Arabia and in the region. Students graduating from the program will be recognized by the Saudi Commission for Health Specialties (SCHS) as a *Specialist in Genetic Counselling*.

2.5 Master Degree in Nanoscience & Nanotechnology (MNT)

The program is materials-oriented with emphasis in materials chemistry, micro-electronics, photonics, and their biomedical and energy applications. Tracks include *Nano materials for Energy & Environmental Applications, and Nano medicine & Nano diagnostics*. Both tracks are Thesis Option.

2.6 Master Degree in Public Health (MPH)

This is a two year program designed for working physicians, residents, fellows, public health officials, policy makers and college graduate students interested in public health. Students have the opportunity to design and conduct community research as well as public health research. At the end of the two-year program, students should develop a comprehensive understanding of the public health professional practice through experience with both academic specialists and experienced practitioners. Students must choose one of three possible tracks: *Mass Gatherings Health (Hajj and Umrah), Biostatistics and Epidemiology,* or *Health Policy & Management.*

2.7 Master Degree in Radiological and Imaging Sciences (MRS)

The program which is open to training men and women, Saudi and non-Saudi, local and international students, is designed in three specialization tracks: *Radiologic Education, Radiologic Management,* Ultrasound. All tracks are courses-only option. The Saudi Commission for Health Specialties (SCHS) has certified (Hajri 23/12/1436) two of the tracks as:

- *Training & Education in Field of Radiological & Imaging Sciences*
- *Management & Supervision in Field of Radiological & Imaging Sciences*

2.7.1 *Radiologic Education*: Aims to prepare and train lecturers in undergraduate radiologic and imaging sciences. Students in this track; in addition to, their training in the advanced sciences and practices of medical radiologic and imaging clinical services, will receive practical training in pedagogical practices, teaching and learning, outcomes assessment, and academic programmatic accreditation.

2.7.2 *Radiologic Management:* Prepares technical supervisors and managers of radiologic and imaging services at free standing imaging centres, hospitals and/or major medical centres. The

focus is on technical management of imaging and related services quality assurances, including clinical service accreditation by the ABR and other comparable accreditation organizations.

2.7.3 *Ultrasound:* Clinically oriented advanced training in ultrasound imaging. Students in this track spend daily rotations at the King Faisal Specialist Hospital & Research Centre's Department of Radiology, where they are engaged in providing ultrasound imaging services under the supervision of certified practitioners. While acquiring their advanced clinical skills in ultrasound, students are taught in the didactic aspects of medical diagnostic imaging and its basic sciences at the Alfaisal University's College of Medicine.

3 List of Graduate Courses

Course Code	Course Title
Master of Business Administration	
MBA 510	Financial Accounting
MBA 511	Quantitative Analysis
MBA 512	Marketing Management
MBA 513	Managerial Economics
MBA 514	Organizational Behavior
MBA 515	Research Methodology
MBA 516	Managerial Finance
MBA 518	Human Resource Management
MBA 519	Strategic Management
MBA 522	Operations Strategy
MBA 528	Managerial Accounting
MBA 530	Managing Strategic Business Projects
MBA 532	Supply Chain Management
MBA 534	Leading Organizational Change
MBA 535	Applied Business Research Project
MBA 538	Entrepreneurship and Innovation
MBA 541	HR Planning, Recruitment & Selection
MBA 542	Contemporary Economic & Financial Issues
MBA 543	Internet Marketing Strategy
MBA 544	Financial Statement Analysis & Security Valuation
MBA 545	Independent Study
MBA 546	Comparative Management
MBA 547	Contemporary International Management Issues
MBA 550	Service Marketing
MBA 551	Derivative Securities
MBA 558	Value Innovation Strategy
MBA 560	Healthcare Management
MBA 565	HR Development & Performance
MBA 573	Applied Econometrics
MBA 574	Global Economics
MBA 575	Negotiations
MBA 581	Managerial Decision Making
MBA 590	Real Estate Analysis
Master of Biomedical Sciences	
MBS 500	Basics of Molecular & Cellular Biology
MBS 501	Topics in Integrated & Systems Biology
MBS 502	Methods in Molecular & Cellular Biology
MBS 503	Signal Transduction I
MBS 505	Advanced Biochemistry
MBS 521	Reproductive Biology And Embryology
MBS 522	Introduction To Assisted Reproduction
MBS 523	Infertility & Reproductive Medicine
MBS 524	Semen Analysis & Processing/Andrology
MBS 525	Advanced Assisted Reproduction
MBS 527	Practical Molecular Biology
MBS 531	Basics Of Microbiology
MBS 532	Fundamentals of Epidemiology & Surveillance
MBS 533	Infection Control Program Design & Management
MBS 534	Environmental Management
MBS 535	Patient Care Proc& Evid Based Infection Control Pract
MBS 536	Competencies In Infection Control

MBS 541	Analytical Biotechnology
MBS 542	Techniques of Biotechnology
MBS 551	OMICS Techniques & their Applications
MBS 552	Advanced Analytical Biochemistry
MBS 553	Analytical Techniques for Clinical Biochemistry
MBS 600	Thesis
REC 502	Biostatistics
REC 503	Research Methodologies
REC 504	Biomedical Ethics

Master of Engineering & Systems Management

MEM 501	Statistics & Data Analytics
MEM 502	Systems Architecture & Engineering
MEM 503	Project & Program Management of Complex Systems
MEM 504	Advanced Engineering Economics and Cost Analysis
MEM 505	Operations Engineering & Management
MEM 506	Leadership Development for Eng & Syst Managers
MEM 507	Applied Computation and Data Science
MEM 508	Stochastic Methods for Engineers & Syst Managers
MEM 509	Systems Modeling and Simulation
MEM 510	Decision & Risk Analysis for Eng & Syst Managers
MEM 511	Deterministic Management Science
MEM 512	Special Topics I
MEM 513	Special Topics II
MEM 514	Logistics & Supply Chain Engineering
MEM 515	Advanced Quality Engineering
MEM 516	Methodologies for Operational Excellence
MEM 517	Production Systems Analysis & Design
MEM 518	Warehouse Systems Analysis & Design
MEM 519	Product & Service Development
MEM 520	Rapid Prototyping for Cyber-Physical Systems
MEM 521	Internet of Things
MEM 522	Information Systems Analysis & Design
MEM 523	Telecom & Network Systems Analysis & Design
MEM 600	Thesis
MEM 601	Research/Capstone Project

Master of Genetic Counselling

MGC 500	Introduction To Medical & Population Genetics
MGC 501	Topics In Genetic Counseling I
MGC 502	Topics In Genetic Counseling II
MGC 503	Psychosocial Aspects Of Genetic Counseling
MGC 504	Genetic Basis Of Inherited Disease
MGC 505	Cancer Genetic Counseling
MGC 506	Biochemical and Newborn Lab Practicum
MGC 508	Molecular Genetics Practicum
MGC 509	Introduction to Anatomy & Physiology
MGC 510	Observational Clinic Rotation
MGC 511	Medical Genetics Practicum
MGC 512	Prenatal Clinic Practicum
MGC 513	Advanced Medical Genetics Clinic Practicum
MGC 514	Ultrasound Clinic Practicum
MGC 515	Genetic Counseling & Islam
MGC 516	Cytogenetics Laboratory Practicum
MGC 517	Clinical Internship
MGC 601	Research/Capstone Project

Master of Nanoscience & Nanotechnology

MNT 502	Nanobiotechnology
MNT 503	Special Topics in Nanomedicine
MNT 504	Biosensors & Lab on a Chip
MNT 510	Introduction to Nanoscience & Nanotechnology -I
MNT 511	Renewable Energy Storage Systems
MNT 512	Polymer Nanocomposites
MNT 513	Topics in Nanomaterials Science
MNT 520	Introduction to Nanoscience in Nanotechnology -II
MNT 530	Experimental Techniques in Nanotech - I
MNT 540	Experimental Techniques in Nanotech - II
MNT 600	Thesis

Master of Public Health

MPH 500	Principles of Biostatistics
MPH 502	Principles of Epidemiology
MPH 503	Environmental and Occupational Health
MPH 504	Communicable Diseases
MPH 505	Non Communicable Diseases
MPH 506	Social & Behavioral Determinants of Health
MPH 507	Advanced Biostatistics
MPH 508	Advanced Epidemiology
MPH 509	Regression Analysis
MPH 510	Principles of Mass Gatherings Health
MPH 511	Principles of Disaster Management
MPH 512	Emerging Infections & Infectious Disease Management
MPH 513	Health Insurance & Health Policy
MPH 514	Quality Assurance in Public Health
MPH 515	Health Care Management
MPH 516	Survival Analysis
MPH 517	Categorical Data Analysis
MPH 518	Ethics in Research
MPH 519	Public Health & Healthcare Systems in KSA
MPH 520	Health Economics
MPH 521	Health Informatics
MPH 522	Global Health
MPH 523	Research Design
MPH 524	Nutrition
MPH 525	Practicum
MPH 526	Seminar
MPH 601	Research/Capstone Project

Master of Radiological & Imaging Sciences

MRS 500	Radiation Counting Statistics
MRS 502	Radiological Research
MRS 503	Ethics in Radiology
MRS 504	Radiological & Imaging Sciences I
MRS 505	Radiological & Imaging Sciences II
MRS 506	Topics in Medical Imaging
MRS 507	Topics in Radiation Therapy
MRS 508	Topics in Nuclear Medicine
MRS 509	RIS Seminar
MRS 510	Academic Program Management
MRS 511	Faculty Development
MRS 512	RIS Instruction & Assessment
MRS 513	RIS Academic Program Accreditation
MRS 514	Radiologic Financial Management
MRS 515	Personnel Management in Radiology
MRS 516	Clinical Accreditation & Quality Management

MRS 517	Professional Development
MRS 518	Ultrasound Physics
MRS 519	Sonography Cross-Sectional Anatomy
MRS 520	Abdominal Sonography
MRS 521	Pelvic Sonography
MRS 522	Obstetrical Sonography
MRS 523	Clinical Sonography
MRS 524	Sonography Procedures
MRS 525	Sonographic Musculoskeletal, Neonatal & Pediatric MRS
MRS 526	Sonographic Vascular & Postoperative Imaging
MRS 527	Echocardiography Imaging
MRS 601	Research/Capstone Project

4. Course Descriptions

4.1. Master of Business Administration

MBA 510 Financial Accounting

Cr Hr: 3 Prerequisite: MBA 511 Grad Scheme: Letter

At the end of this course, students will be able to read, analyse and interpret financial data, appreciate the financial consequences of their decisions and make informed business decisions. In this course, students will study the assumptions and concepts underlying financial reporting, the basic accounting equation and how it is affected by financial transactions, the accounting cycle, accounting adjustments and constructions and interpretations of financial statements: the income statement, balance sheet, owners' equity statement and cash flow statement.

MBA 511 Quantitative Analysis

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

At the end of this course, students will be able to explain introductory quantitative and optimization methods and their application in business, demonstrate the uses, capabilities, and limitations of various mathematical models and statistical procedures for exploring, summarizing and presenting data, as well as interpret the results of statistical procedures and tests to make informed decisions based on data, using analyses enabled by MS Excel.

MBA 512 Marketing Management

Cr Hr: 3 Prerequisite: MBA 514 Grad Scheme: Letter

At the end of this course, students will be able to demonstrate the application, analysis and synthesis of marketing management concepts and strategies. Within this context, student will demonstrate and evaluate current approaches in marketing, marketing research, consumer decision making, the marketing environment, marketing information system, product management, pricing decisions, distribution systems, integrated marketing communications, and managing the marketing effort. Key strategic marketing concepts and processes are emphasized using lectures, case studies, client presentations, development of individual/team marketing plans, and a sophisticated marketing simulation game.

MBA 513 Managerial Economics

Cr Hr: 3 Prerequisite: MBA 511 Grad Scheme: Letter

At the end of this course, students will be able to explain the relationship between the economic environment and business operations, apply microeconomic principles, including supply and demand, elasticity and their implication for product pricing strategies, analyse a range of macroeconomic variables including inflation, unemployment and economic growth as well as fiscal and monetary policy tools.

MBA 514 Organisational Behaviour

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

At the end of this course, students will be able to synthesise relevant scholarly knowledge to explain and evaluate solutions to OB challenges manifested at the level of individual behaviour, interpersonal or group behaviour, or at an organisation-wide level. In addition, they will be able to apply and analyse knowledge from all three levels of analysis

(individual, group, organization) to interpret, justify, and/or evaluate behaviour in simulated or live organisational applications.

MBA 515 Research Methodology

Cr Hr: 3 Prerequisite: MBA 511 Grad Scheme: Letter

At the end of this course, students will be able to design, analyse, apply, and evaluate appropriate research designs and methodologies to address the systematic enquiry and solution of organizational problems. They will also be able to present and defend a research proposal before a panel of assessors.

MBA 516 Managerial Finance

Cr Hr: 3 Prerequisite: MBA 511 Grad Scheme: Letter

At the end of this course, students will be able to analyse the best ways to use capital to improve future opportunities to earn money and minimize the impact of financial shocks. They will also be able to apply key principles, such as financial statements and firm's cash flow analysis, interest rates and required returns, long-term investment decisions using capital budgeting techniques, short-term financial decision and working capital management, valuation, capital structure, and dividend policy.

MBA 518 Human Resource Management

Cr Hr: 3 Prerequisite: MBA 514 Grad Scheme: Letter

At the end of this course, students will be able to explain and appraise key principles and practices for line managers and HRM practitioners to manage people and performance across organisations. They will also be able to evaluate HRM principles and practices for competitive relevance and strategic coherence. Topics covered include strategic HRM, HR planning, talent management, training & development, rewards & motivation, workplace effectiveness & commitment.

MBA 519 Strategic Management

Cr Hr: 3 Prerequisite: MBA 516 Grad Scheme: Letter

At the end of this course, students will be able to compare and contrast organisations' internal characteristics and external competitive environments to create coherent and competitive strategic plans. In addition, they will be able to analyse and apply business factors to compile a strategic management plan for competitive advantage.

MBA 522 Operations Strategy

Cr Hr: 3 Prerequisite: MBA 511 Grad Scheme: Letter

At the end of this course, students will be able to organize people and resources to gain a competitive advantage in the delivery of goods and services. This course approaches this challenge primarily from two perspectives: (1) how should a firm profitably offer its products; (2) how can a firm best organize and acquire resources to deliver its portfolio of products to customers. Topics covered in this course include capacity & location planning, resource planning, scheduling, supply chain, forecasting, inventory control, and quality assurance.

MBA 528 Managerial Accounting (3 hours)

Cr Hr: 3 Prerequisite: MBA 510 Grad Scheme: Letter

At the end of this course, students will be able to understand of the role of accounting information systems in management decision-making and strategy execution, operational support, and enhancing organizational effectiveness and competitiveness. In this course,

students will learn how business managers can use cost behavior and cost analysis to plan and control the cost and profitability of their products, services and customers. Students will also learn how managers use financial and nonfinancial information to improve processes, align target-setting, decision-making and performance evaluation with the strategies and value drivers of their firms and design and develop new products, and motivate employee performance.

MBA 530 Managing Strategic Business Projects

Cr Hr: 3 Prerequisite: MBA 522 Grad Scheme: Letter

At the end of this course, students will be able to apply project management principles and processes to effectively manage the implementation of business initiatives and projects and their alignment with organizational performance improvements and strategic objectives. The students will also be able to evaluate the impact of interrelated processes on project management, such as stakeholder management, leadership, triple constraints, and earned value management.

MBA 532 Supply Chain Management

Cr Hr: 3 Prerequisite: MBA 522 Grad Scheme: Letter

At the end of this course, students will be able to address the activities involved in management of the chain of supplies. Major processes to manage the flows of goods and information through core functions such as procurement, supplier development, demand management and distribution are introduced with the objective of achieving a sustainable competitive advantage and optimizing the value perceived by customers and the long-term performance of the firm and the supply chain as a whole.

MBA 534 Leading Organisational Change

Cr Hr: 3 Prerequisite: MBA 514 Grad Scheme: Letter

At the end of this course, students will be able to analyse the role that organisational cultures and a variety of formal organisational arrangements play to facilitate or impede organisational change and renewal. Students will also apply (and evaluate the application of) principles and processes of change management in contemporary business organisations.

MBA 535 Applied Business Research Project

Cr Hr: 3 Prerequisite: core course relevant to field of research Grad Scheme: Letter

At the end of this course, students will be able to apply relevant research skills to meet the requirements of a systematic research plan which has been agreed by the student and supervisory faculty member, and approved by the MBA Office, verifying that the plan matches relevant programme requirements. Applied Business Research Projects relate to the following fields of MBA study: Economics, Finance, Management, Accounting, Project Management, Operations Management, Human Resource Management, Strategy, E-business, Health Management, Entrepreneurship, and Marketing.

MBA 538 Entrepreneurship and Innovation

Cr Hr: 3 Prerequisite: MBA 513 Grad Scheme: Letter

At the end of this course, students will be able to develop an entrepreneurial orientation towards sustainable business growth. They will also be provided with an integrated and practical approach to bringing innovation to market. In addition, they will be able to examine the creative process of innovation and introduce techniques that creatively solve problems and promote inventive solutions.

MBA 541 HR Planning, Recruitment & Selection

Cr Hr: 3 Prerequisite: MBA 518 Grad Scheme: Letter

At the end of this course, students will be able to analyse and evaluate the principles and models of strategic HR planning, recruitment and selection. They will also be able to develop action plans for managerial application of effective strategic HR planning, recruitment and selection in the workplace, relevant to KSA workplaces and individual attraction, motivation and retention.

MBA 542 Contemporary Economic & Financial Issues

Cr Hr: 3 Prerequisite: MBA 516 Grad Scheme: Letter

At the end of this course, students will be able to demonstrate a global perspective, awareness, and understanding of current economic issues while applying advanced economic theory and knowledge to a selection of current economic and financial issues in society.

MBA 543 Internet Marketing Strategy

Cr Hr: 3 Prerequisite: MBA 512 Grad Scheme: Letter

At the end of this course, students will be able to demonstrate the implementation and synthesis of marketing techniques that are particular to the Internet and other related technologies. Within this context, students will demonstrate and explores the marketing mix over the Internet, online consumer behaviour, online marketing research, website developments, legal and ethical issues, and social media marketing. Understanding these aspects is necessary to develop successful Internet marketing techniques in the era of internet revolution.

MBA 544 Financial Statement Analysis & Security Valuation

Cr Hr: 3 Prerequisite: MBA 510 Grad Scheme: Letter

At the end of this course, students will be able to comprehensively understand financial statement analysis fundamentals. Student will learn how to use financial statement analysis to evaluate a firm's past performance, make judgment about its earnings quality, determine its current financial position, examine the underlying accounting assumptions of its major assets and liabilities, forecast its future prospect and estimate its fundamental value. The core emphasis of this course is on using financial statement analysis for equity valuation purposes. The course has a very practical emphasis. Students will apply methods of fundamental analysis and equity valuation in a serious of assignments and projects using financial data of publicly traded Saudi companies.

MBA 545 Independent Study

Cr Hr: 3 Prereq: core course relevant to field of independent study Grad Scheme: Letter

At the end of this course, students will be able to demonstrate relevant learning outcomes to meet the requirements of a learning plan which has been agreed by the student and supervisory faculty member, and approved by the MBA Office and the Dean, verifying that the plan matches relevant graduate programme requirements. The following fields of MBA study are applied in Independent Study: Economics, Finance, Management, Accounting, Project Management, Operations Management, Human Resource Management, Strategy, E-business, Health Management, Entrepreneurship, and Marketing.

MBA 546 Comparative Management

Cr Hr: 3 Prerequisite: MBA 514 Grad Scheme: Letter

At the end of this course, students will be able to analyse, compare, and then evaluate the contextually appropriate application of management approaches from a variety of international settings into their local environments. They will also be able to design and apply a comparative benchmarking process to differentiate and reconstruct relevant management responses for local application.

MBA 547 Contemporary International Management Issues

Cr Hr: 3 Prerequisite: MBA 513 Grad Scheme: Letter

At the end of this course, students will be able to demonstrate their ability to responsibly gather intelligence about specific contemporary international business and/or managerial topics. They will also analyse the opportunities and threats posed by these topics and respond with locally relevant recommendations and strategies.

MBA 550 Service Marketing

Cr Hr: 3 Prerequisite: MBA 512 Grad Scheme: Letter

At the end of this course, students will be able to demonstrate how they use the relevant body of marketing knowledge to develop, implement, and evaluate the effectiveness of the design of marketing programs in the service sector, such as bank/financial intuitions, healthcare, education, tourism, consultancy/training, insurance and telecommunications.

MBA 551 Derivative Securities

Cr Hr: 3 Prerequisite: MBA 516 Grad Scheme: Letter

At the end of this course, students will be able to explain basic derivative pricing – the relation between the price of the underlying assets and derivatives, as well as basic option pricing and explain how various types of the derivatives are traded, and the risk and use of each type. The students will also be able to analyse a portfolio of derivatives securities to hedge and develop several speculative strategies involving options.

MBA 558 Value Innovation Strategy

Cr Hr: 3 Prerequisite: MBA 538 Grad Scheme: Letter

At the end of this course, students will be able to explain challenges and shortcomings of conventional strategy and develop a foundation for competing using value innovation strategy. They will also be able to explain key concepts, frameworks and tools of value innovation strategy, apply the fundamental methodology for creating and capturing new market space, and analyse the logic and methods that are common to strategic moves in business settings.

MBA 560 Healthcare Management

Cr Hr: 3 Prerequisite: MBA 516 Grad Scheme: Letter

At the end of this course, students will be able to explain the foundations of healthcare management - as a discipline and a management process. They will analyse and evaluate the ethical and legal considerations of healthcare decisions. In addition, they will be able to demonstrate an understanding of the healthcare system, policies, healthcare quality, patient safety and decision-making in hospitals and healthcare organisations.

MBA 565 HR Development and Performance

Cr Hr: 3 Prerequisite: MBA 518 Grad Scheme: Letter

At the end of this course, students will be able to explain, assess, and leverage training and development to maximize workforce performance, improve organizational effectiveness, and increase the attractiveness of the organization by offering the benefits of skill acquisition and intellectual capital development.

MBA 573 Applied Econometrics

Cr Hr: 3 Prerequisite: MBA 513 Grad Scheme: Letter

At the end of this course, students will be able to analyse economic data, using real-world data and applying statistical and mathematical methods with the purpose of giving empirical content to economic theory – either verifying it or refuting it. Students will also be able to evaluate economic / financial theories and their empirical applications.

MBA 574 Global Economics

Cr Hr: 3 Prerequisite: MBA 513 Grad Scheme: Letter

At the end of this course, students will be able to demonstrate their comprehension of macroeconomic theories, models, tools of analysis and applications to assess the impact of the dynamic global business environment on their business decisions. Students will also be able to analyse the global effects of monetary policy and fiscal policy using real-life macroeconomic data while distinguishing between economic policy decisions during crises. Analytical tools will be applied to analyse global economic data for right business decisions.

MBA 575 Negotiations

Cr Hr: 3 Prerequisite: MBA 514 Grad Scheme: Letter

At the end of this course, students will be able to apply a variety of negotiation practices, using role-playing simulations that address distributive, integrative, team-based, and multi-party negotiations. They will also evaluate conflict, ethics, and dispute resolution from the perspectives of a negotiator and also as a third party.

MBA 581 Managerial Decision Making

Cr Hr: 3 Prerequisite: MBA 511 Grad Scheme: Letter

This course is designed to make you a better managerial decision maker. It helps recognizing the decision problem, how to represent/model its essential structure, and how to analyze the problem with the formal and informal tools grounded in decision theory. It provides students with the skill to think effectively about the inputs into a decision analysis, whether to trust the analysis, and how to use the outputs to guide actions by themselves and their firms. Case studies are heavily used.

MBA 590 Real Estate Analysis

Cr Hr: 3 Prerequisite: MBA 516 Grad Scheme: Letter

At the end of this course, students will be able to gain a broad overview of real property concepts and characteristics, legal considerations, influences on real estate values, types of value, economic principles, market area analysis, investment and financing issues, brokerage and management. Special emphasis will be given to the changing roles of real estate executives and professionals, methods of creating economic and social value and the dynamics of emerging markets.

4.2 Master of Biomedical Sciences

MBS 500 Basics of Molecular & Cell Biology

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is designed to introduce the student to basic cell structure and function as well as the molecular mechanisms by which cells interact with their environment.

MBS 501 Topics in Integrated & Systems Biology

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is designed to allow students to study the fundamental principles of biomedical sciences and how the different organs or biological systems work together in an integrated fashion to attain “homeostasis”.

MBS 502 Methods in Molecular & Cellular Biology

Cr Hr: 3 Pre-requisite: MBS 500 Grad Scheme: Letter

This course is designed to allow students to develop skills in basic cellular and molecular biology techniques. These objectives will be covered both in a formal lecture setting where students apply their theoretical knowledge to practice the techniques in the laboratory.

MBS 503 Signal Transduction I

Cr Hr: 3 Pre-requisite: MBS 500 Grad Scheme: Letter

This course is designed to allow students to develop an understanding of the major signal transduction pathways and how such pathways can influence metabolism as well as gene expression.

MBS 505 Advanced Biochemistry

Cr Hr: 3 Pre-requisite: Biochemistry Grad Scheme: Letter

The course aims to provide an advanced understanding of the core principles and topics of Biochemistry including, nutrients and nutrient sensing systems, cell cycle regulation and oncogene function in cancer, protein structure and function, enzymology, electrolytes and acid – base imbalance, major metabolic pathways, with an emphasis on metabolic interrelationships.

MBS 521 Reproductive Biology and Embryology

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

Reproductive Biology and Embryology course provides students with comprehensive understanding of human reproductive biology. It is designed to offer students required knowledge to pursue assisted reproductive technology and/or a reproductive biology research career.

MBS 522 Introduction to Assisted Reproduction

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

Introduction to Assisted Reproduction course provides students with basic understanding of human assisted reproduction and clinical embryology. It is designed to offer students required knowledge and practical skills to pursue assisted reproductive technology and clinical embryology.

MBS 523 Infertility and Reproductive Medicine

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

The Infertility and Reproductive Medicine course provides students with a comprehensive understanding of infertility from a clinical perspective. It is designed to offer students required knowledge to pursue assisted reproductive technology and/or a reproductive biology research career.

MBS 524 Semen Analysis and Processing/Andrology

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

Semen analysis and processing/Andrology course provides students with necessary theoretical and practical aspects of examination and processing of human semen. It is designed to offer students to understand to most recent WHO recommendation on the standardization of semen analysis and processing.

MBS 525 Advanced Assisted Reproduction

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

The Advanced Assisted Reproduction course provides students with practical part of human assisted reproduction and clinical embryology. It is designed to offer students required knowledge and practical skills to pursue assisted reproductive technology and clinical embryology.

MBS 527 Practical Molecular Biology

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

Practical Molecular Biology course introduces students to basic experimental techniques and procedures widely used in molecular biology research and clinical genetic analysis.

MBS 531 Basics of Microbiology

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The course will encompass the study of the general characteristics of microorganisms, the processes by which these microorganisms cause human disease and how these pathogens are identified in the diagnostic laboratory. The classification and mechanism of action of major groups of antibiotics as well as methodologies for antibiotic susceptibility testing will also be covered. The development of antibiotic resistance and associated concerns will be discussed and related to the global situation. This course will also encompass the study of infectious diseases in the healthcare setting with particular reference to healthcare associated infections (HCAI). The challenges of emerging and re-emerging infections in the clinical setting will also be addressed.

MBS 532 Fundamentals of Epidemiology and Surveillance

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is designed to introduce the fundamental concepts in epidemiology and surveillance as it applies to institutional infection control. The uses of epidemiological data in clinical decision-making for infection control programs will be addressed. This course explores the contemporary principles of the science and practice of surveillance and monitoring and outbreak management it applies to institutional infection control. The design of surveillance systems, collection, compilation and interpretation of surveillance data will be covered

MBS 533 Infection Control Program Design & Management

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The course explores the role of the infection control practitioner, systems of clinical governance, infection control framework and management plans, and performance indicators for infection prevention and control. Students develop skills in the management and coordination of infection control programs, with a particular emphasis on prevention. The students will also develop the skills needed to assess needs, develop goals and measurable objectives, and prepare lesson plans for educational offerings.

MBS 534 Environmental Management

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The course is designed to help students to develop a clear understanding of the importance of various cleaning, sterilization and disinfection processes as essential elements of an infection control program. The indications, approaches, equipment and agents utilized for cleaning, sterilization and disinfection processes in the healthcare setting will be discussed. The criteria for selecting and monitoring the usefulness of the agents, equipment and monitoring approaches used for sterilization & disinfection will be covered.

MBS 535 Patient Care Processes & Evidence Based Infection Control Practices

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The course is designed bring together all the concepts learnt in the previous courses and enable students apply these concepts in various scenarios in the health care setting. This course sets the stage for the more intensive hands-on experience that students will be engaged in during the second year of the course.

MBS 536 Competencies in Infection Control

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This is a practical course during which students will be mentored by experienced infection prevention and control professionals in assigned hospital units. Students will observe and perform a pre-determined number of procedures under the supervision of the mentor.

MBS 541 Analytical Biotechnology

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course focuses on enhancement technology development by promoting cross-disciplinary approaches directed toward solving key problems in biology and medicine. The purpose is to support and teach the fundamental principles and practical uses of major instrumental techniques. Techniques related to HPLC, capillary electrophoresis, gel electrophoresis, and mass spectrometry will be covered in the course. Fundamentals in analytical biotechnology include basic and practical aspects of characterizing and analyzing DNA, proteins, and small metabolites.

MBS 542 Techniques of Biotechnology

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course focuses on the fundamentals of DNA tools biotechnology, molecular genetics biotechnology, DNA isolation, manipulation and amplification techniques, restriction enzymes, microarrays and biochips, DNA sequencing, genetic engineering and biotechnology, biotechnology revolution, gene therapy, gene doping and beyond.

MBS 551 OMICS Techniques & their Applications

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

MBS 552 Advanced Analytical Biochemistry

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

MBS 553 Analytical Techniques for Clinical Biochemistry

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

MBS 600 Thesis

Cr Hr: 9 Grad Scheme Pass/Not Pass

Students completing a Thesis Option master's degree are expected to write a report, referred to as a thesis, on the results of an original investigation, in conjunction with a Master's Advisory Committee. Length and style of the thesis vary by college/department. All these are filed with the Office of Graduate Studies. A *Master's Advisory Committee* will be formed for each student. The Chair of the Committee must have research and graduate student advising experience. This Committee will assist the student in the formulation of the Thesis Proposal, and later advise the student in the execution of the research, the Thesis write-up, and help the student to prepare for the oral defense.

REC 502 Biostatistics

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is designed to review the fundamental principles of probability and statistics. This will be covered both in a formal lectures setting, self-directed learning setting with tutorials, and during the statistical analysis lab. This course will give students direct practice in the statistical reasoning skills needed to choose appropriate procedures for analyzing research data and to better understand the design, conduct, and analysis and subsequently interpret the results of biomedical research studies.

REC 503 Research Methodologies

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is designed to understand fundamentals of research, characteristics of research, research designs, methods of sampling, data collection, processing and analysis, ethical considerations and use of literature review, sources of information and organization of information.

REC 504 Biomedical Ethics

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is designed to introduce students to the basic principles and methods of analysis from ethical theories applicable to contemporary moral problems in biomedical research and professional practice. This includes evaluation of scientific misconduct in relation to international standards of research through case studies with examples from international settings.

4.3 Master of Engineering & Systems Management

MEM 501 Statistics and Data Analytics

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Review of probability and probability distributions. Data description. Random samples and sampling distributions. Parameter estimation. Tests of hypotheses. Design and analysis of single-factor experiments: the analysis of variance. Design of experiments with several factors. Simple linear regression and correlation. Multiple regression. Nonparametric statistics. Introduction to statistical quality control and reliability engineering.

MEM 502 Systems Architecture and Engineering

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

General introduction to systems engineering using both the classical V-model and the new META approach. Topics include stakeholder analysis, requirements definition, system architecture and concept generation, trade-space exploration and concept selection, design definition and optimization, system integration and interface management, system safety, verification and validation, and commissioning and operations. Discusses the trade-offs between performance, lifecycle cost and system operability. Readings based on systems engineering standards and papers. Students apply the concepts of systems engineering to a cyber-electro-mechanical system, which is subsequently entered into a design competition.

MEM 503 Project & Program Management of Complex Systems

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Covers the elements of project management critical to the success of engineering projects: project management framework, strategic management and project selection, project organization, human aspects of project management, conflicts and negotiations, scope management, time management, cost management, risk management, contracts and procurement, project termination, the project management office, and modern developments in project management.

MEM 504 Advanced Engineering Economics & Cost Analysis

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Covers the theory and application of advanced engineering economics principles and methods. Studies the effects of inflation, depreciation and taxes, cost estimation, sensitivity analysis, risk and uncertainty, capital budgeting, multi-attribute decision making, advanced asset replacement analysis and real option analysis.

MEM 505 Operations Engineering & Management

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course focuses on business processes, procedures, analytic methods and strategies used to transform various inputs into finished goods and services. The main course aim is to familiarize students with the problems and issues confronting operations managers, and provide them language, concepts, insights and tools to deal with these issues in order to gain competitive advantage through operations. Operational issues include designing, acquiring, operating, and maintain the facilities and processes; purchasing new materials; controlling and maintain inventories; and providing the proper labor to produce a good service so that customer expectations are met.

MEM 506 Leadership Development for Engineers & Syst Managers

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course includes topics such as public speaking, leading diverse and creative teams, dealing with uncertainty and adversity and strategies for having difficult conversations in the workplace. It is a general introduction of engineering leadership at the graduate level.

MEM 507 Applied Computation and Data Science

Cr Hr: 3 Prerequisite: MEM 501 Grad Scheme: Letter

Presents fundamentals of computing and programming in an engineering context with an emphasis on data science. Introduces web computing, data structures, and techniques for data analysis. Includes filtering, linear regression, simple machine learning (clustering and classifiers), and visualization. Surveys techniques for ingesting, processing, analyzing, and visualizing big data from a range of fields, including environmental, transportation, supply chain, city data. Basic concepts of data storage and web server-side programming are covered. Students use JavaScript and HTML5 programming language to complete weekly assignments.

MEM 508 Stochastic Methods for Engineers & Syst Managers

Cr Hr: 3 Prerequisite: MEM 505 Grad Scheme: Letter

Stochastic systems analysis applied to engineering problems. Topics include: Markov chains, queuing theory, queuing applications.

MEM 509 Systems Modeling and Simulation

Cr Hr: 3 Prerequisite: MEM 505 Grad Scheme: Letter

Generating discrete and continuous random variables. Discrete-event simulation. Statistical analysis of simulated data.Variance reduction techniques. Statistical validation techniques. Markov chain and Monte Carlo methods. Experience with a modern discrete-event simulation package (e.g., ARENA, ProModel).

MEM 510 Decision & Risk Analysis for Eng & Syst Managers

Cr Hr: 3 Prerequisite: MEM 501 Grad Scheme: Letter

Covers the theory and practice of analyzing decisions arising in engineering systems. Covers multiple objectives, influence diagrams, decision trees, sensitivity analysis, probability assessment, multi-attribute utility and human biases. Describes practical applications through real world systems model building. Uses decision analysis software and spreadsheets to solve real-life problems through case studies.

MEM 511 Deterministic Management Science

Cr Hr: 3 Prerequisite: MEM 505 Grad Scheme: Letter

Mathematical modeling and the operations research approach for solving engineering decision problems. Formulation and classification of optimization models. The concept of improving search directions. Formulation of linear programs (LPs).The simplex algorithm and alternative approaches for solving LPs. Duality and sensitivity analysis in linear programming. Multi-objective optimization and goal programming. Network flow models. Formulation and solution methods of integer programs. Nonlinear programming. Introduction to metaheuristics. The course emphasizes problem formulation and solution via modern optimization modeling software

MEM 512 Special Topics I

Cr Hr: 3 Prerequisite: Department Approval Grad Scheme: Letter

Selected topics of current interest in Engineering & Systems Management. The course is designed to give the students an opportunity to pursue special studies not offered in other courses.

MEM 513 Special Topics II

Cr Hr: 3 Prerequisite: Department Approval Grad Scheme: Letter

Selected topics of current interest in Engineering & Systems Management. The course is designed to give the students an opportunity to pursue special studies not offered in other courses.

MEM 514 Logistics & Supply Chain Engineering

Cr Hr: 3 Prerequisite: MEM 505 Grad Scheme: Letter

Explores key logistical issues related to the design, planning and operation of supply chain systems. Includes topics such as supply chain structure, supply chain performance metrics, network design, facility location in a supply chain, aggregate planning, planning and managing inventory in a supply chain, transportation in a supply chain, pricing and revenue management

MEM 515 Advanced Quality Engineering

Cr Hr: 3 Prerequisite: MEM 501 Grad Scheme: Letter

Covers the techniques and applications of quality control using total quality management and reliability engineering. Includes sampling procedures, product quality and control, statistical process control charts and troubleshooting, product acceptance sampling plans, process capability analysis, an introduction to six sigma and design of experiment, time-to-failure, failure rate, reliability and system reliability.

MEM 516 Methodologies for Operational Excellence

Cr Hr: 3 Prerequisite: MEM 505 Grad Scheme: Letter

Development of the concept of a lean organization. Identification of waste activities. How to use flow analysis to analyze a process and identify non-value-added activities. Understanding of the standard lean operations tools: 6S, visual workplace and visual order control, manufacturing cells, use of takt time, setup time reduction, standard worksheets, etc. The benefits of incorporating lean concepts during the development phase of new products. Error-controlling devices and how they can be used during the manufacturing process to reduce errors. Understanding what sigma quality concepts are, introduction to how to conduct kaizen blitzes, and why continuous improvement is important to the organization.

MEM 517 Production Systems Analysis & Design

Cr Hr: 3 Prerequisite: MEM 505 Grad Scheme: Letter

This course investigates fundamental properties that govern production systems and utilizes them for analysis, design and continuous improvement. Using actual case studies of real-world problems and successful, implemented solutions, this course teaches students to design novel, efficient production systems, understand reasons for lost productivity and design continuous improvement projects, and use Measurement-Based Management techniques for operating production systems in Just Right regimes. Topics include quantitative methods for analysis of production systems; analytical methods for design of lean in-process and finished goods buffering; measurement-based methods for

identification and elimination of production system bottlenecks; and system-theoretic properties of production lines.

MEM 518 Warehouse Systems Analysis & Design

Cr Hr: 3 Prerequisite: MEM 505 Grad Scheme: Letter

This courses focuses on efficient warehouse operations and covers the following topics: Management of warehouse fundamentals: space and time; Storage policies: dedicated and shared, and their use; Warehouse analytics: discover opportunities for improvement. Size and stock a forward area for split-pallet and split-case picks. Pallet operations and layout; Order-picking in high-volume and in low-volume environments; Benchmarking warehouse performance; Maintaining inventory accuracy; Warehouse Management Systems; and Issues and trends in automation.

MEM 519 Product & Service Development

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The focus of this course is the integration of marketing, design, and production functions of the firm in creating a new product or service. The course is designed to prepare students to contribute in the development of strategies and tasks relevant to new product or service introductions.

MEM 520 Rapid Prototyping for Cyber-Physical Systems

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Design and prototype of large-scale technology intensive systems. Design project incorporating infrastructure systems and areas such as transportation and hydrology; for example, watershed sensor networks, robot networks for environmental management, mobile Internet monitoring, open societal scale systems, crowd-sources applications, traffic management. Design of sensing and control systems, prototyping systems, and measures of system performance. Modeling, software and hardware implementation.

MEM 521 Internet of Things

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The course introduces the Internet of Things (IoT) along with its definition, its enabling technologies, and its applications in various sectors. It further describes technology models for tagging, sensing and actuation; as well as data generation and processing. The latter includes both cloud- and edge-based IoT management and processing architectures. The course involves a hands-on-experience that culminates in an implementation project.

MEM 522 Information Systems Analysis and Design

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course provides students with concepts of the analysis and design processes and allows students to use industry standard methodology and framework to develop Industrial business information systems. The course combines terminology with conceptual and practical approaches to designing and implementing business systems. Analytical and problem-solving skills are developed through a modern integrated, structured approach. Predictive and adaptive approaches to systems development life cycle (SDLC) using an iterative approach are covered. The course contains the entire analysis and design process from conception through implementation, including training and support, system documentation and maintenance, and relevant project management techniques.

MEM 523 Telecommunications & Network System Analysis & Design

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The course introduces telecommunications networks and their various design and operation considerations. After a review of the widely used technologies and their applications, the course focuses on technical and economic aspects of network design including: architecture considerations (access-core-homing); link and network quality indicators; basics of teletraffic engineering; preliminaries of network provisioning and backbone design; and CAPEX/OPEX considerations and tradeoffs. The course culminates in a real-world network analysis and/or design case study.

MEM 600 Thesis

Cr Hr: 9 Grad Scheme Pass/Not Pass

Students completing a Thesis Option master's degree are expected to write a report, referred to as a thesis, on the results of an original investigation, in conjunction with a Master's Advisory Committee. Length and style of the thesis vary by college/department. All these are filed with the Office of Graduate Studies. A *Master's Advisory Committee* will be formed for each student. The Chair of the Committee must have research and graduate student advising experience. This Committee will assist the student in the formulation of the Thesis Proposal, and later advise the student in the execution of the research, the Thesis write-up, and help the student to prepare for the oral defense.

MEM 601 Research/Capstone Project

Cr Hr: 6 Grad Scheme: Letter

This intent of this project is to enable to the student to learn to pursue a chosen topic through a literature search on atopic approved by the graduate advisor, collection and analysis of data, project report preparation and defence. Although this course officially begins in second year the trainees are encouraged to identify a project topic and supervisor in their first year so that they are able to begin their research project in the fall of their second year.

4.4 Master of Genetic Counselling

MGC 500 Introduction to Medical & Population Genetics

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This course will focus on introduction specific genetic principles as they relate to clinical practice. The text for this course will be Genetics in Medicine, 6th Edition and Thompson. Didactic instruction will be enhanced through student led tutorials. All students are expected to review the chapter in advance of class and complete the problem sets at the end of each chapter. The problem sets will be reviewed during the tutorial.

MGC 501 Topics in Genetic Counselling I

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This course will serve as an introduction to the profession of Genetic Counselling and will provide students with the information necessary to function in the clinical setting. Basic skills used by genetic counsellors will be introduced and practiced. Psychodynamic approaches to counselling and their relevance to the field of genetic counselling will be reviewed.

MGC 502 Topics in Genetic Counselling II

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

The course will build upon the foundation established in the second semester and continue to develop the clinical skills used in genetic counselling. Interview and letter writing skills will be reinforced; techniques for presenting genetic information to different age groups, to individuals with cognitive delay and to individuals from different cultural backgrounds will be reviewed. Available medical and social services for the individual/family with a genetic condition will be discussed.

MGC 503 Psychosocial Aspects of Genetic Counselling

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This course will deal with ethical issues in genetic counselling with special emphasis on prenatal diagnosis. The student will be expected to understand the psychological and social impact genetic disease has on patients and families and how counselling techniques can be modified accordingly. The student will be expected to demonstrate skillful assessment of psychosocial needs of patients and families and to provide appropriate counselling intervention.

MGC 504 Genetic Basis of Inherited Disease

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This course describes the chromosomal basis of human disease and stresses the molecular and biochemical mechanisms underlying inherited disorders. Diagnostic laboratory methods will be an important aspect of this course.

MGC 505 Cancer Genetic Counselling

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This course will introduce students to the molecular basis, clinical characteristics and management of hereditary cancer syndromes. Specific types of cancer syndromes will be reviewed with emphasis on pedigree evaluation, pathology, management and genetic testing options. The psychosocial impact of these conditions on the family and individual will also be examined.

MGC 506 Biochemical and Newborn Screening

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

Students will develop an understanding of general biochemical laboratory methods, sample requirements and set up, biochemical techniques and quality control issues.

MGC 508 Molecular Genetics Practicum

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

Students will develop an understanding of general molecular biology methods, sample requirements, set up, molecular genetic techniques such as DNA isolation, PCR, multiplex PCR, Southern blotting, analysis of results and development of accuracy estimates.

MGC 509 Introduction to Anatomy & Physiology

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

An introduction to the structure and function of human body systems, such as the cardiovascular, musculoskeletal, respiratory, nervous, digestive, renal, reproductive and endocrine systems, including metabolism and homeostasis.

MGC 510 Observational Clinic Rotation

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

In their second semester, students will have the opportunity to observe in wide variety of specialty clinics to learn first-hand about some of the clinical issues faced by individuals/families with these genetic conditions. Students are expected to attend two half-day clinics per week.

MGC 511 Medical Genetics Clinic Practicum

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

In the third semester, students will gain practical experience performing supervised counselling for patients referred to the medical genetics clinic for a variety of health concerns. Students will be responsible for researching the reason for referral, establishing a management plan, obtaining all necessary and available historical information, eliciting and constructing a pedigree, and presenting the patient to the attending physician. Students will have increasing responsibility for counselling patients in clinic, under the supervision of a staff genetic counsellor and/or geneticist.

MGC 512 Prenatal Clinic Practicum

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This rotation will provide students with practical experience performing genetic counselling for patients referred for prenatal diagnosis.

MGC 513 Advanced Medical Genetics Clinic Practicum

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This 8 wk. rotation, in the students second year, provides them with an opportunity to further develop and refine their genetic counselling skills. Students will perform supervised genetic counselling for patients referred for a variety of health concerns. Students will have increasing responsibility for counselling including results follow-up and counselling letters.

MGC 514 Ultrasound Clinic Practicum

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This 8 wk. rotation will provide students with practical experience performing genetic counselling for patients referred for prenatal diagnosis of fetal anomalies on ultrasound.

MGC 515 Genetic Counselling & Islam

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This course will deal with an exploration of the teachings of Islam as they apply to the practice of genetic counseling within the Kingdom of Saudi Arabia. This course will also introduce students to the basic principles and methods of analysis from ethical theories applicable to contemporary moral problems in biomedical research and professional practice. Course content consists of; Foundations of Bioethics: ethical theories, moral principles, and medical decisions; Ethics of Termination: abortion; impaired infants; euthanasia and physician-assisted suicide; Teachings of Islam as they apply to the practice of genetic counseling within the Kingdom of Saudi Arabia.

MGC 516 Cytogenetics Laboratory Practicum

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

Students will develop an understanding of general cytogenetic laboratory methods, sample requirements and set up, timing, harvesting, slide preparation and analysis. Under the supervision of a technologist, students will perform and complete chromosome analysis on a sample of their own blood (students may request use of another specimen if they wish). Observation of molecular cytogenetic techniques will provide students with an understanding of the process necessary to perform fluorescence in-situ hybridization analysis (FISH).

MGC 517 Clinical Internship

Cr Hr: 0 Prerequisite: None Grad Scheme: Pass/Not Pass

MGC 601 Research/Capstone Project

Cr Hr: 6 Prerequisite: None Grad Scheme: Letter

This intent of this project is to enable to the student to learn to pursue a chosen topic through a literature search on atopic approved by the graduate advisor, collection and analysis of data, project report preparation and defence. Actual submission to a journal will be encouraged ,but not required .Although this course officially begins in second year the trainees are encouraged to identify a project topic and supervisor in their first year so that they are able to begin their research project in the fall of their second year.

4.5 Master of Nanoscience & Nanotechnology

MNT 502 Nanobiotechnology

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Classification and categories of nanodiagnostic technologies. Types of nanoparticles and nanotag biolabels. Types of Nanobiosensors. DNA-based nanobiosensors. Diagnosis of diseases using nanobiosensors. Nanoformulation of drugs and their delivery with nanocarriers. Regenerative nanomedicine. Characterization of nanobiosystems. Biomimetic nanotechnology. Ecological advantages and risks of nanotechnology.

MNT 503 Special Topics in Nanomedicine

Cr Hr: 3 Pre-req. MNT 510, MNT 530 Grad Scheme: Letter

An in-depth study of a selected topic in Nanomedicine. Topics are chosen according to the interests of students and faculty.

MNT 504 Biosensors & Lab-on-a-Chip

Cr Hr: 3 Pre-req. MNT 510, MNT 530 Grad Scheme: Letter

To provide students with advanced, state of the art, knowledge of bioelectronics, biosensors and associated electronic interfaces, bio-analytical chemistry, biomedical imaging, micro fabricated biosensor systems, and lab-on-a-chip technologies.

MNT 510 Introduction to Nanoscience & Nanotechnology I

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course focuses on the fundamentals of nanoscience such as the basic properties of nanoparticles, structural control of nanoparticles, characterization methods for nanostructured materials, characteristics and behavior of nanoparticles, Environmental and safety issues with nanoparticles.

MNT 511 Renewable Energy Storage Systems

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The course offers an overview of Energy Storage technologies. A special focus is given to technologies that can be utilized at grid scale for renewable energy systems. Both the theory and the applied technologies of direct electric, electromechanical, and electrochemical energy storage systems are covered. Technologies include pumped hydroelectric, fly-wheel, compressed air, Nickel Metal hydride, Sodium-Sulfur, capacitors, and magnetic energy storage. The coverage of these technologies relates them to their application scope of power quality, bridging power, and energy management. In addition, design factors are addressed including efficiency computations and cost per unit storage capacity.

MNT 512 Polymer Nanocomposites

Cr Hr: 3 Pre-req. MNT 510, MNT 530 Grad Scheme: Letter

This is introductory course in polymer nanocomposites will focus on materials, manufacturing methods, characterization, and applications. It will include different types of nanomaterials that are commonly used in modifying the polymer matrix composites.

MNT 513 Topics in Nanomaterials Science

Cr Hr: 3 Pre-req. MNT 510, MNT 530 Grad Scheme: Letter

An in-depth study of a selected topic in materials sciences and nanomaterials. Topics are chosen according to the interests of students and faculty.

MNT 520 Introduction to Nanoscience & Nanotechnology II

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course focuses on various applications of nanotechnologies such as: Catalysis; surface area of nanoparticles and porous materials. Carbon nanostructures; Nanodevices and Nanomedicine.

MNT 530 Experimental Techniques in Nanotech - I

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The courses will focus on a variety of instrumental methods and techniques commonly applied to the characterization of nanomaterials. Particular attention will be placed on the theory behind the measurements, instrument safety, sample preparation and data analysis/interpretation. Experimental Techniques in part one, Experimental Techniques in Nanoscience I (MNT530) will focus on X-ray, optical and electron characterization techniques.

MNT 540 Experimental Techniques in Nanotech - II

Cr Hr: 3 Prereq. MNT 510, MNT520 Grad Scheme: Letter

The courses will focus on a variety of instrumental methods and techniques commonly applied to the characterization of nanomaterials. Particular attention will be placed on the theory behind the measurements, instrument safety, sample preparation and data analysis/interpretation. Part two, Experimental Techniques in Nanoscience II (MNT 540), will cover morphological and physical properties characterization tools.

MNT 600 Thesis

Cr Hr: 9 Grad Scheme Pass/Not Pass

Students completing a Thesis Option master's degree are expected to write a report, referred to as a thesis, on the results of an original investigation, in conjunction with a Master's Advisory Committee. Length and style of the thesis vary by college/department. All these are filed with the Office of Graduate Studies. A *Master's Advisory Committee* will be formed for each student and will consist of three members; an Alfaisal faculty member as the Major Advisor and Chair, and two other members, one of whom may be from an organization outside of the University. The Chair of the Committee must have research and graduate student advising experience. This Committee will assist the student in the formulation of the Thesis Project Proposal, and later advise the student in the execution of the research project, the Thesis write-up, and help the student to prepare for the oral defense.

4.6 Master of Public Health

MPH 500 Principles of Biostatistics

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Principles of Biostatistics course is the first in a series of courses designed to provide the students with basic understanding of main biostatistical concepts. This course provides an introduction to the use of biostatistics in the fields of epidemiology and public health. Topics include descriptive statistics, probability distributions, parameter estimation, hypothesis testing, sampling techniques, analysis of variance, and correlation. It provides basic training in statistical analysis using statistical software.

MPH 502 Principles of Epidemiology

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Principles of Epidemiology course introduces basic epidemiologic concepts and methods and their use in public health. Specifically, it covers measures of disease occurrence, common sources and types of data, measures of association, bias and confounding, main study designs, and sources of error in epidemiologic studies.

MPH 503 Environmental & Occupational Health

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

The Environmental & Occupational Health course covers the basic principles of environmental and occupational health and the sources of hazards to human health that exist within the Saudi workplace and environment. This knowledge allows students to develop strategies that effectively intervene to alleviate and potentially, on the long run, prevent adverse health effects caused by environmental agents and conditions prevalent in the Kingdom.

MPH 504 Communicable Diseases

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Communicable diseases are illnesses that can be transmitted from person to person or animal to person. There are more than 70 Communicable diseases, such as Tuberculosis, Malaria, Corona Virus, HIV/Aids etc. Socioeconomic, environmental and behavioural factors, as well as international travel and migration, foster and increase the spread of communicable diseases. Vaccine-preventable, foodborne, zoonotic, health care-related and communicable diseases pose significant threats to human health and may sometimes threaten international health security. This course envisions creating public health tools to help physicians implement effective disease prevention and control programs to address their risk factors. The course also addresses the current paradigms and controversies in epidemiology, health systems and policy research related to communicable diseases, equipping participants with the language and skills to progress further in their fields. The objective is to train students in the interdisciplinary approaches to communicable diseases prevention, treatment and care. The course will also expose participants to key theoretical and empirical knowledge in communicable diseases' research from a range of disciplines, including epidemiology, economics and health systems in the Kingdom of Saudi Arabia, surrounding regions and internationally.

MPH 505 Non Communicable Diseases

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Non Communicable Diseases Course addresses the major non-communicable diseases (NCDs) including cardiovascular diseases, diabetes, cancer and chronic lung disease, and their risk factors such as diet, exercise, tobacco, and alcohol, which are responsible for considerable morbidity and premature adult mortality globally and specifically in the KSA.

The course is based on an understanding the evidential basis for the cause of NCDs from epidemiological and bio-medical studies, followed by detailed analysis of population health risk factors and the challenges they pose for population approaches to prevention and control of NCDs. The course will address the challenges of different population approaches to NCDs control, and their record of success and failures globally and in the Kingdom.

MPH 506 Social & Behavioural Determinants of Health

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Social & Behavioural Determinants of Health course covers the basic principles of the field of social and behavioural determinants of health including the theoretical and methodological approaches to the study of social and behavioural determinants of health, the role of social and behavioural determinants in the health of individuals and society, and present evidence for social and behavioural determinants of health and their relationship to health outcomes.

MPH 507 Advanced Biostatistics

Cr Hr: 3 Pre-requisite: MPH 500 Grad Scheme: Letter

Advanced Biostatistics builds on the material learned in previous biostatistics and epidemiology courses. Specifically, the course will focus on analysis of variance, linear regression, logistic regression, Cox proportional hazards regression, analysis of categorical data, and model building techniques. Emphasis will be placed on the practical implementation of modern biostatistical methods in analyzing public health data.

MPH 508 Advanced Epidemiology

Cr Hr: 3 Pre-requisite: MPH 502 Grad Scheme: Letter

Advanced Epidemiology course builds on material learned in previous Biostatistics and Epidemiology courses. The course will focus on applying that knowledge to the design, implementation, analysis and interpretation of observational epidemiologic studies including cross-sectional, case-control and cohort studies. The course addresses issues related to the validity of measures of exposure and disease, and sources of potential errors in interpreting epidemiologic studies. This course also introduces the basic principles of clinical epidemiology.

MPH 509 Regression Analysis

Cr Hr: 3 Pre-requisite: MPH 500 Grad Scheme: Letter

Regression Analysis course covers estimation, and testing hypotheses in linear and logistic regression, regression diagnostics, analysis of variance, and adjusting for covariates. Emphasis is on the application of regression method covered in this course. This is a hands-on, applied course where students will use statistical software to analyze data drawn primarily from the fields of medicine, epidemiology and public health.

MPH 510 Principles of Mass Gatherings Health

Cr Hr: 3 Pre-req. MPH 500, MPH 502 Grad Scheme: Letter

The course covers the public health principles of hajj and umra as events of mass gatherings. It discusses the dynamics of the hajj and umra events, their boundaries, dates and available contingencies. It also defines the main elements of the Incident Command System, describes the responsibilities of the various services participating in the preparation, monitoring, and response during Hajj and Umra, and finally summarizing

interdependence of various health and safety services related to engineering, and health communications in mass gatherings areas.

MPH 511 Principles of Disaster Management

Cr Hr: 3 **Pre-req. MPH 500, MPH 502** **Grad Scheme: Letter**

The course introduces students to the different aspects of natural and industrial disasters, while integrating public health research principles, designs and practices. The course covers recent and historical case studies as a basis for developing the critical thinking and leadership skills needed by public health professionals in crisis situations. The course addresses international, regional, and local settings, as well as the social, economic, and political aspects of disaster planning, preparedness, and alleviation.

MPH 512 Emerging Infections & Infectious Diseases Management

Cr Hr: 3 **Pre-req. MPH 505, MPH 502** **Grad Scheme: Letter**

Emerging Infections and Infectious Diseases Management course introduces the concepts of microbes and infection, examines some basic tools to understand infectious diseases and the pathogens, and illustrates the importance of infectious disease in the history of humankind. It covers the emergence of new pathogens, the re-emergence of old pathogens, the growing problem of antimicrobial resistance, and the threat of bioterrorism pose to public health and patient management. It also covers the role of nations in the global control of emerging infectious diseases, with special reference to the Kingdom of Saudi Arabia and the Gulf Region. Class discussion explores some of the controversial issues in the prevention and management of infectious diseases.

MPH 513 Health Insurance & Health Policy

Cr Hr: 3 **Pre-req. MPH 500, MPH 502** **Grad Scheme: Letter**

The course addresses the impact that health insurance & policy development and analysis have on public health. It provides students with the basic skills for collecting, analyzing and communicating information on health insurance & health policy issues. Students will learn what health insurance & health policy are; who the policymakers are in public health; who the actors are that are affected by health care policy; and the major influences in determining what insurances & policy get implemented. It provides students with a framework for understanding, developing and analyzing a range of health care insurance & policy issues. The course begins by introducing an approach for analyzing any public health insurance & policy issues. It explores how insurance & policy formation impact access, quality, costs, as well as medical innovation.

MPH 514 Quality Assurance in Public Health

Cr Hr: 3 **Pre-req. MPH 500, MPH 502** **Grad Scheme: Letter**

The Public Health Quality Forum (PHQF) defined public health quality as, “The degree to which policies, programs, services, and research for the population increase desired health outcomes and conditions in which the population can be healthy.” Quality Assurance in Public Health course provides students with an overview of public health quality assurance principles and practices and their role and impact on public health. The course covers the basics of developing, implementing and evaluating measurable indicators of quality for public health medicine.

MPH 515 Health Care Management

Cr Hr: 3 **Pre-req. MPH 500, MPH 502** **Grad Scheme: Letter**

The main purpose of this course is to develop the knowledge themes that management of healthcare depends on including leadership perspectives, health care policy, ethics and

legal aspects of healthcare. The development of such themes allows the MPH students to apply them in real life situations.

MPH 516 Survival Analysis

Cr Hr: 3 Pre-req. MPH 500, MPH 502 Grad Scheme: Letter

Survival Analysis course demonstrates statistical methods for analyzing and interpreting time-to-failure data. The techniques described include the construction and analysis of failure rates, survival curves, significant tests for comparing survival curves, and semi-parametric models for the analysis of time-to-failure data including the proportional hazards model. Skills for using statistical software to perform the analyses are developed. In addition, study design is covered, including sample size and power calculations.

MPH 517 Categorical Data Analysis

Cr Hr: 3 Pre-req. MPH 500, MPH 502 Grad Scheme: Letter

Categorical Data Analysis course provides an overview of methods used in analyzing binary and other discrete response data, with applications to epidemiological and public health studies. It is an introductory level course that presumes some knowledge of applied statistics and epidemiology. Topics discussed include 2 × 2 tables, m × 2 tables, tests of independence, measures of association, power and sample size determination, stratification and matching in design and analysis. This is followed by an introduction to logistic regression analysis.

MPH 518 Ethics in Research

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Ethics in Research course covers the ethical fundamentals and national regulations of human subject's research. Issues considered include informed consent, studies of vulnerable populations, clinical trials, and epidemiologic research studies. It also studies ethical concerns surrounding public health issues including conflicts of interest, social accountability, and risk benefit analyses.

MPH 519 Public Health and Healthcare Systems in KSA

Cr Hr: 3 Pre-req. MPH 500, MPH 502 Grad Scheme: Letter

An introductory course takes a policy and politics angle to healthcare's three main topics - access, cost and quality. The roles of patients, physicians, hospitals, insurers, and pharmaceutical companies will be established. The courses discussed the interaction between the government and these different groups. Current national health care policy initiatives and, especially, the interests of class members will steer the specific topics covered in the course. The course provides skills for critical and analytical understanding of the Saudi Healthcare Systems.

MPH 520 Health Economics

Cr Hr: 3 Pre-req. MPH 500, MPH 502 Grad Scheme: Letter

Health Economics course develops an understanding of the relevance of economic concepts to the healthcare and public health sectors. It provides an application of economic models to demand, supply, and their interaction in the Saudi medical economy. It also covers the role of economic factors in the development of public policy concerning health, and healthcare. The course develops an understanding of the functioning and limitations of the market system and applying micro models in economic problem solving activities. The theoretical framework of this course includes the basic economic problems, supply and demand, analysis, consumer theory, production and cost theory, market structure, market failure and microeconomic policy.

MPH 521 Health Informatics

Cr Hr: 3 Pre-req. MPH 500, MPH 502 Grad Scheme: Letter

Health Informatics course provides an overview of health information management systems (HIMS), the data within these systems and the translation of the data into information and subsequently knowledge. The course will begin with a look at the types of data that flows through healthcare organizations. Students will then be introduced to information systems infrastructure, architecture, and types of systems that exist within organizations. Finally, students will examine how information is incorporated into operational processes, clinical processes, and medical research.

MPH 522 Global Health

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Global Health with a concentration on the developing world and emerging economies (LMIC) is an introduction to the major health issues of LMIC nations, social determinants of health, models for addressing health disparities, innovations for improving health, health and human rights and the role of international organizations in improving global health. Students will explore the major demographic and economic changes, causes of morbidity and mortality, review factors which influence these outcomes, look at health systems, examine the role of human rights and analyze strategies to improve health and recommendation sustainable solutions.

MPH 523 Research Design

Cr Hr: 3 Pre-req. MPH 500 Grad Scheme: Letter

Research Design course covers the basic concepts and skills of research design, highlighting how they relate to public health research. The course identifies the strengths and weaknesses of key epidemiologic study designs, and how to draft a research proposal. It covers the basics of public health data collection, and analysis and strategies to manage bias and assess the quality of published research. The Course structure is designed to move research methodology from a teaching process to an investigational process, from memorizing to brainstorming, from knowledge transfer to knowledge creation, and from competitive learning to collaborative learning.

MPH 524 Nutrition

Cr Hr: 3 Grad Scheme: Letter

Nutrition course studies nutrition from the perspective of the community rather than the individual, including the scientific basis for nutritional requirements and recommendations, nutrition through the life span, and the role of nutrition in health promotion and disease prevention.

MPH 525 Practicum

Cr Hr: 3 Grad Scheme: Letter or Pass/Not Pass

MPH 526 Seminar

Cr Hr: 1 Grad Scheme: Letter or Pass/Not Pass

MPH 601 Research/Capstone Project

Cr Hr: 6 Grad Scheme: Letter

The capstone project involves identifying public health problems in a real-world setting and developing the skills to address it. Each student is required to complete a six-credit "capstone" project which may be a research or an intervention project. The capstone project utilizes knowledge gained through classroom coursework, and is the degree's culminating work. The end product of the project is something that can be implemented and used. The capstone includes the design of an approved individual or group research or implementation project demonstrating professional-level knowledge and skills. Students may begin their projects after completing all the MPH required core courses..

4.7 Master of Radiological & Imaging Sciences

MRS 500 Radiation Counting Statistics

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is designed to review the fundamental principles of probability and statistics as applied to the radiologic and imaging sciences. The course cover formal in-classroom lectures, self-directed learning with guided tutorials, and statistical analysis sessions. At the conclusion of the course, students will have developed necessary skills to understand and perform basic statistical analysis of radiation counting and biomedical research data and interpretation.

MRS 502 Radiological Research

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is requires students to work in groups on a hypothetical research grant application in the general area of their research interest based on a list of case studies provided by the instructor. Upon completion of the course students will be able to: prepare a comprehensive literature review on a specific research area; write concise project objectives; expand on project objectives by developing a salient methodology; propose a management plan to coordinate a project; write a detailed budget estimate; explain (briefly) the expected results; and develop a short resume/CV.

MRS 503 Ethics in Radiology

Cr Hr: 2 Prerequisite: None Grad Scheme: Letter

This course is designed to introduce students to the basic principles of ethical theories applicable to exposing humans to radiation, a known carcinogen. It will also discuss ethics of biomedical research and professional practice, including scope and code of practice in each radiologic profession as set by its respective professional organization.

MRS 504 - Radiological and Imaging Sciences I

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course discusses basic sciences of radiological professions including physical principle, sources of radiation and radioactivity, radiation interactions, radiation detection instrumentation, data capture, processing and management.

MRS 505 Radiological and Imaging Sciences II

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course will review the basic of radiological imaging modalities in preparation for advanced training. Topics include: conventional and digital radiography, mammography, and interventional radiology. Computer tomography, bone densitometry, magnetic resonance imaging and ultrasound imaging. Image storage and transmission systems PACS, and teleradiology.

MRS 506 Topics in Medical Imaging

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This is the first of three required courses of all students in the program. These courses discuss technical advancements in medical diagnostic imaging. The first course is designed to review and survey digital diagnostic medical imaging modalities, their physical principles and their clinical applications. Examples include: digital radiography, magnetic resonance imaging, computed tomography and interventional procedures.

MRS 507 Topics in Radiation Therapy

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This is the second of a series of three required courses of all students in the program. The course is designed to discuss all radiation therapy modalities, their physical principles and their clinical applications. Examples include: brachytherapy, external beam therapy including advance methods like cyberknife, IMRT and IGRT.

MRS 508 Topics in Nuclear Medicine

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This is the third of three required courses of all students in the program. The course is designed to discuss all nuclear medical imaging and therapeutic modalities, their physical principles and their clinical applications. Examples include: planar nuclear imaging, SPECT/CT and PET/CT as well as radionuclidic therapy applications.

MRS 509 RIS Seminar

Cr Hr: 1 Prerequisite: None Grad Scheme: Pass/Fail

The course aims to train the students for in-classroom research presentation in preparation for their oral defense of their capstone project. The primary aim of the course is to orient student to the latest and most current research in the field. In doing so, they will be asked to research the literature on current developments in the radiological and imaging sciences, prepare slide presentations, write brief reports and present their slide to peers in the classroom.

MRS 510 Academic Program Management

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Orientation to academic program directorship, faculty and staff management, student affairs, faculty and academic affairs, the higher education system in the KSA, USA and other examples and how colleges and universities work. Self-study preparation, applying for and maintaining accreditation, site visits, etc. Introduction to the meaning and concepts of serving as radiological and imaging sciences faculty. Topics include scholarship, advisement, teaching plus faculty recruitment, retention, and development. Principles and practice of effective pedagogy, curriculum development and evaluation in radiological and imaging sciences.

MRS 511 Faculty Development

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Pedagogical orientation to academic programs, faculty and staff management, student affairs, faculty and academic affairs, and the higher education system in the KSA. Principles and practice of effective pedagogy, curriculum development and evaluation in radiological and imaging sciences.

MRS 512 RIS Instruction & Assessment

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

RIS instruction and assessment includes principles and practice of effective pedagogy, curriculum development and evaluation in radiological and imaging sciences. Outcome assessments, benchmarking.

MRS 513 RIS Academic Program Accreditation

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Preparation of a complete an application selfstudy for professional academic program accreditation. Accreditation requirements of all three JRCs will be discussed in depth. Emphasis on the role of the radiological educators and program directors. Additional discussion on the NCAAA requirements and accreditation schemes are also covered.

MRS 514 Radiologic Financial Management

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course is designed to survey the field of finance and provide the foundation in relation to the health sciences industry. Topics include sources of business and financial information, financial statement analysis, the time value of money, the nature and measurement of risk, financial institutions, investments and corporate finance.

MRS 515 Personnel Management in Radiology

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

This course provides an in-depth review of case studies in contemporary, diverse workforce issues in a variety of health care environments. Students examine current human resource theories and models and published studies on personnel management issues. They then develop simulations and formulate innovative solutions for recruiting, training, and retaining health care personnel.

MRS 516 Clinical Accreditation & QM

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Application for and maintenance of professional accreditation of clinical operations, i.e, ACR and IAC . Emphasis on the role of the radiological technical administrator. Students will learn to view quality from a variety of functional perspectives and in the process, gain a better understanding of the problems associated with improving quality, also quality tools utilized in service and international/ environments.

MRS 517 Professional Development

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Discusses matters and topics related to personnel management in the radiologic and imaging sciences. Topics include: professional development as well as certification maintenance requirements; continuing education course design, accreditation and offering; professional career development and advancement and peer mentoring.

MRS 518 Ultrasound Physics

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Presents general acoustic principles including sound wave parameters, energy transfer, through wave propagation, pulsed and continuous wave generation and parameters, surface reflection processes, and transducer construction. Discusses beam profile consideration and an introduction to A-mode, B-mode, and M-mode. Emphasizes applied principles of physics, knobology, and instrumentation relative to ultrasound. Discussion of properties of sound and presents advanced concepts including computer technology and the instrumentation used to create and store the ultrasound image, and introduction to fluid dynamics, spectral, color and amplitude Doppler. Emphasizes advanced principles of physics, knobology, acoustical artifacts, bioeffects/safety and quality assurance relative to ultrasound.

MRS 519 Sonography Cross-Sectional Anatomy

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Introduces gross anatomic structures and abnormalities of cranial, neck, thoracic, abdominal and pelvic regions relative to diagnostic ultrasound. Presents correlations to cadaver slides as well as CT and MRI images.

MRS 520 Abdominal Sonography

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Presents normal and pathophysiological abdominal anatomy, physiology, related vasculature, scanning techniques and protocols regarding the abdominal sonographic examination.

MRS 521 Pelvic Sonography

Cr Hr: 3 Grad Scheme: Letter

Presents female pelvic anatomy, physiology, pathophysiology, related vasculature, scanning techniques and protocols regarding the pelvic sonographic examination. Reviews the anatomy and physiology of reproduction. Presents normal and abnormal first trimester sonography.

MRS 522 Obstetrical Sonography

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Presents obstetrical applications of diagnostic ultrasound. Reviews the anatomy and physiology of fetal development. Presents normal and abnormal second and third trimester sonography. Emphasizes obstetrical measurements and fetal dynamics.

MRS 523 Clinical Sonography

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

Students perform sonographic procedures during clinical rotations at affiliate sites under the supervision of designated clinical instructors. Evaluation of cognitive, effective and psychomotor skills is based on competency in scanning protocols and techniques, professionalism and proficiency in patient care. Provides supervised clinical practice of obstetrical and gynecological sonography in a clinical setting.

MRS 524 Sonography Procedures

Cr Hr: 3 Prerequisite: None Grad Scheme: Letter

MRS 525Sonographic Musculoskeletal, Neonatal & Pediatric MRS

Cr Hr: 3 (2+1) Prerequisite: None Grad Scheme: Letter

This course introduces students to anatomy and physiology relevant to sonographers in the imaging of the musculoskeletal system, neonatal brain, hips and abdomen. The focus of the course is on relational and cross sectional anatomy in the musculoskeletal system, neonatal brain, hips and abdomen. Sectional human anatomy in the transverse, sagittal and coronal planes. Pediatric abdominal organs associated with the gastrointestinal tract such as liver, gallbladder and pancreas are emphasized. In addition, structure and function of the spleen, kidneys, adrenal glands and the blood vessels supplying the region is included in the course.

MRS 526Sonographic Vascular & Postoperative Imaging

Cr Hr: 3 (2+1) **Prerequisite: None** **Grad Scheme: Letter**

Sonographic scanning methods, techniques and protocols related to selected examinations of the cardiovascular system. Gross anatomical structure and function and relevant pathophysiological disorders associated with the cardiovascular and immune systems. Interpretational skills in respect to artifacts and the sonographic appearances of the examinations addressed will be gained. The process of organ rejection and the role of ultrasound in the postoperative evaluation of liver and renal transplants. Quality assurance, sonographic measurement techniques, the utilization of specific duplex modalities and the use of stents and grafts in vascular surgery

MRS 527Echocardiography Imaging

Cr Hr: 3 (2+1) **Prerequisite: None** **Grad Scheme: Letter**

This course will cover the cardiac structure, function, pathophysiology and scanning techniques at an advanced level. During this unit students will progress through standard heart views to focus on the ultrasound appearance and Doppler haemodynamics of congenital and acquired cardiac abnormalities and common syndromes. Students will develop the ability to recognise fetal arrhythmias. Students will acquire knowledge of advanced imaging techniques tailored to echocardiography including spatio-temporal imaging correlation (STIC), 3 / 4-D colour Doppler, tissue Doppler imaging (TDI) and some common cardiac physiological measurements.

MRS 601 Research/Capstone Project

Cr Hr: 6 **Prerequisite: None** **Grad Scheme: Pass/Fail**

The intent of this project is to enable to the student to learn to pursue a chosen topic through a literature search on a topic approved by the graduate advisor, collection and analysis of data, project report preparation and defense. Although this course officially begins toward the end of the second year, the trainees are encouraged to identify a project topic and supervisor in their first year so that they are able to begin their research project in the winter of their second year.

5. Curricula & Study Plans

5.1 Master Degree in Business Administration (MBA)

5.1.1 General

Curriculum

Credit Hours Required for a Master of Business Administration (MBA)

Type of Courses	Compulsory	Elective	Total
Core	24	-	24
Subject	-	-	-
Electives	-	18	18
Total	24	18	42

Core Courses (24 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 510	Financial Accounting	3	MBA 511
MBA 511	Quantitative Analysis	3	-
MBA 512	Marketing	3	-
MBA 513	Managerial Economics	3	MBA 511
MBA 514	Organizational Behavior	3	-
MBA 516	Managerial Finance	3	MBA 514
MBA 519	Strategic Management	3	6 core courses
MBA 522	Operations Strategy	3	MBA 511

Elective Courses (18 Cr Hr)

Course No.	Course Name	Cr.	Prerequisite
MBA 515	Research Methodology	3	MBA 511
MBA 518	Human Resource Management	3	MBA 514
MBA 530	Managing Strategic Business Projects	3	MBA 511
MBA 534	Leading Organizational Change	3	MBA 514
MBA 535	Applied Business Research Project	3	MBA 511
MBA 538	Entrepreneurship and Innovation	3	MBA 514, MBA 51
MBA 541	HR Planning, Recruitment & Selection	3	MBA 518
MBA 543	Internet Marketing Strategy	3	MBA 512
MBA 544	Financial Statement Analysis & Security Valuation	3	MBA 510
MBA 545	Independent Study	3	-
MBA 546	Comparative Management	3	MBA 514
MBA 547	Contemporary International Management Issues	3	MBA 514
MBA 550	Service Marketing	3	MBA 512
MBA 558	Value Innovation Strategy	3	MBA 538
MBA 560	Healthcare Management	3	-
MBA 590	Real Estate Analysis	3	MBA 513

Suggested Study Plan

First Year / Fall Semester				**First Year/Spring Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBA 511	Quantitative Anal	3	-	MBA 510	Financial Accounting	3	MBA 511
MBA 513	Managerial Econ	3	MBA 511	MBA 512	Marketing	3	-
MBA 514	Organizat Behav	3		MBA 522	Operations Strategy	3	MBA 511
				Elective		3	
	TOTAL	9			TOTAL	12	
Second Year / Fall Semester				**Second Year/ Spring Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBA 516	Managerial Fin	3	MBA 514	MBA 519	Strategic Management	3	6 core crs
Elective		3		Elective		3	
Elective		3		Elective		3	
				Elective		3	
	TOTAL	9			TOTAL	12	

5.1.2 Finance

Curriculum

Credit Hours Required for a Master of Business Administration (MBA)

Type of Courses	Compulsory	Elective	Total
Core	36	-	36
Subject	-	-	-
Electives	-	6	6
Total	**36**	**6**	**42**

Core Courses (36 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 510	Financial Accounting	3	MBA 511
MBA 511	Quantitative Analysis	3	-
MBA 512	Marketing	3	-
MBA 513	Managerial Economics	3	MBA 511
MBA 514	Organizational Behavior	3	-
MBA 516	Managerial Finance	3	MBA 514
MBA 519	Strategic Management	3	6 core courses
MBA 522	Operations Strategy	3	MBA 511
MBA 549	Corporate Finance	3	
MBA 551	Derivative Securities	3	
MBA 553	Bank Management	3	
MBA 561	Investments and Portfolio Theory	3	

Elective Courses (6 Cr Hr)

Course No.	Course Name	Cr.	Prerequisite
MBA 540	Islamic Finance	3	MBA 511
MBA 560	Financial Econometrics	3	MBA 514
MBA 570	Risk Management	3	MBA 511
MBA 580	Insurance	3	MBA 514
MBA 544	Financial Statement Analysis and Valuation	3	MBA 511

Suggested Study Plan

First Year / Fall Semester				**First Year/Spring Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBA 511	Quantitative Anal	3	-	MBA 510	Financial Accounting	3	MBA 511
MBA 513	Managerial Econ	3	MBA 511	MBA 512	Marketing	3	-
MBA 514	Organizat Behav	3	-	MBA 522	Operations Strategy	3	MBA 511
				Elective		3	
	TOTAL	9			TOTAL	12	
Second Year / Fall Semester				**Second Year/ Spring Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBA 516	Managerial Fin	3	MBA 514	MBA 519	Strategic Management	3	6 core crs
MBA 551	Derivative Securit	3	-	MBA 561	Invest & Portf Theory	3	-
MBA 553	Bank Managemnt	3	-	MBA 549	Corporate Finance	3	-
				Elective		3	-
	TOTAL	9			TOTAL	12	

5.1.3 Healthcare Management

Curriculum

Credit Hours Required for a Master of Business Administration (MBA)

Type of Courses	Compulsory	Elective	Total
Core	36	-	36
Subject	-	-	-
Electives	-	6	6
Total	36	6	42

Core Courses (36 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 510	Financial Accounting	3	MBA 511
MBA 511	Quantitative Analysis for Bus (*or* MPH 500 Biostatistics)	3	
MBA 513	Managerial Economics	3	
MBA 514	Organizational Behavior	3	
MBA 516	Managerial Finance	3	MBA 511
MBA 518	Human Resource Management	3	
MBA 519	Strategic Health Management	3	
MBA 522	Operations Strategy	3	MBA 511
MPH 513	Health Insurance & Health Policy	3	
MPH 515	Healthcare Management	3	
MPH 521	Health Informatics	3	
MPH 525	Healthcare Managem't Practicum *or* International Study	2	
MPH 526	Healthcare Management Seminar	1	

Elective Courses (6 Cr Hr) One from MPH Elective Courses & one from MBA Elective Courses

Course No.	Course Name	Cr.	Prerequisite
MBA 512	Marketing Management	3	MBA 514
MBA 528	Managerial Accounting	3	MBA 510
MBA 532	Supply Chain Management	3	MBA 522
MBA 534	Leading Organizational Change	3	MBA 514
MBA 538	Entrepreneurship and Innovation	3	MBA 513
MBA 565	HR Development and Performance	3	MBA 512
MBA 561	Managerial Decision Making	3	MBA 511
MPH 514	Quality Assurance in Public Health	3	MBA 650
MPH 511	Principles of Disaster Management	3	MBA 514
MPH 504	Communicable Diseases	3	MBA 512 & 514
MPH 505	Non-Communicable Diseases	3	MBA 513
MPH 503	Environmental and Occupational Health	3	MBA 560
MPH 506	Social & Behavioral Determinants of Health	3	MBA 582
MPH 502	Principles of Epidemiology	3	MBA 582

Suggested Study Plan

First Year / Fall Semester				**First Year/Spring Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBA 511	Quant Anal Bus *or* MPH 500 Biostat	3	-	MBA 510	Financial Accounting	3	MBA 511
MBA 513	Managerial Econ	3		MBA 522	Operations Strategy	3	MBA 511
MBA 514	Organiz Behavior	3		MBA 518	Hum Res Mangm't	3	
				Elective*		3	
	TOTAL	9			TOTAL	12	
Second Year / Fall Semester				**Second Year/ Spring Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBA 516	Managerial Finan	3	MBA 511	MBA 519	Str Hlth Management	3	
MPH 515	Healthcare Mangt	3		MPH 521	Health Informatics	3	
MPH 513	Hlth Pol & Hlth Ins	3		MPH 526	Hlth Mngmnt Seminar	1	
				MPH 525	Hlth Mnt Prct or Int Std	2	
				Elective*		3	
	TOTAL	9			TOTAL	12	

** take elective in summer*

5.2 Master Degree in Biomedical Sciences (MBS)

5.2.1 Analytical Biochemistry

Curriculum

Credit Hours Required for a Masters of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	15	-	15
Thesis	9	-	9
Free Electives	-	-	-
Total	**33**	**-**	**33**

Core Courses (9 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	3	
REC 503	Research Methodologies	3	
REC 504	Biomedical Ethics	3	-

Subject Courses (15 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBS 500	Basics of Molecular & Cell Biology	3	
MBS 505	Advanced Biochemistry	3	
MBS 551	OMICS Techniques & their Applications	3	
MBS 552	Advanced Analytical Biochemistry	3	
MBS 553	Analytical Techniques for Clinical Biochemistry	3	

Core and Subject courses:	24
Thesis (MBS 600)	9
TOTAL CREDIT HOURS REQUIRED	**33**

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
REC 502	Biostatistics	3		REC 504	Biomedical Ethics	3	-
REC 503	Research Methodologies	3		MBS 551	OMICS techniques and their applications	3	
MBS 500	Basics of Molec & Cell Biology	3		MBS 552	Advanced analytical Biochemistry	3	
	TOTAL	9			TOTAL	9	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis A	cc (0)		MBS 600	Thesis B	9	
MBS 553	Analyt Techn Clin Biochem	3					
MBS 505	Advanced Biochemistry	3					
	TOTAL	6			TOTAL	9	

5.2.2 Biotechnology

Curriculum

Credit Hours Required for a Masters of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	15	-	15
Thesis	9	-	9
Free Electives	-	-	-
Total	**33**	**-**	**33**

Core Courses (9 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	3	
REC 503	Research Methodologies	3	
REC 504	Biomedical Ethics	3	-

Subject Courses (15 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBS 500	Basics of Molecular & Cell Biology	3	
MNT 502	Nano biotechnology	3	
MBS 505	Advanced Biochemistry	3	
MBS 541	Analytical Biotechnology	3	
MBS 542	Techniques of Biotechnology	3	

Core and Subject courses:	24
Thesis (MBS 600)	9
TOTAL CREDIT HOURS REQUIRED	**33**

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
REC 502	Biostatistics	3		REC 504	Biomedical Ethics	3	-
REC 503	Res Methodologies	3		MNT 502	Nano biotechnology	3	
MBS 500	Bas Molec Cell Biology	3		MBS 541	Analytical Biotechnology	3	
	TOTAL	**9**			**TOTAL**	**9**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis A	cc (0)		MBS 600	Thesis B	9	
MBS 542	Techniq Biotechnology	3					
MBS 505	Adv Biochemistry	3					
	TOTAL	**6**			**TOTAL**	**9**	

5.2.3 Clinical Embryology & Reproductive Biology

Curriculum

Credit Hours Required for a Masters of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	15	-	15
Thesis	9	-	9
Free Electives	-	-	-
Total	**33**	**-**	**33**

Core Courses (9 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	3	
REC 503	Research Methodologies	3	
REC 504	Biomedical Ethics	3	-

Subject Courses (15 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBS 500	Basics of Molecular & Cell Biology	3	
MBS 527	Practical Molecular Biology	2	
MBS 521	Reproductive Biology & Embryology	2	
MBS 522	Introduction to Assisted Reproduction	2	
MBS 523	Infertility & Reproductive Medicine	2	
MBS 524	Semen Analysis & Processing/Andrology	2	
MBS 525	Advanced Assisted Reproduction	2	

Core and Subject courses:	24
Thesis (MBS 600)	9
TOTAL CREDIT HOURS REQUIRED	**33**

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
REC 502	Biostatistics	3		REC 504	Biomedical Ethics	3	-
REC 503	ResMethodologies	3		MBS 527	Pract Molecular Biol	2	
MBS 500	Bas Molec Cell Biology	3		MBS 521	Repr Biology Embryol	2	
				MBS 522	Intro Assisted Reprod	2	
	TOTAL	**9**			**TOTAL**	**9**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis-A	cc (0)		MBS 600	Thesis-B	9	
MBS 523	Infert Reprod Med	2					
MBS 524	Sem anal proc/Androl	2					
MBS 525	Adv Assisted Reprod	2					
	TOTAL	**6**			**TOTAL**	**9**	

5.2.4 Infection Control

Curriculum

Credit Hours Required for a Masters of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	18		18
Thesis	9	-	9
Free Electives	-		
Total	36		36

Core Courses (9 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	3	
REC 503	Research Methodologies	3	
REC 504	Biomedical Ethics	3	-

Subject Courses (18 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBS 531	Basics of Microbiology	3	
MBS 532	Fundamentals of Epidemiology & Surveillance	3	
MBS 533	Infection Control Program Design & Management	3	
MBS 534	Environmental Management	3	
MBS 535	Patient Care Proc. & Evid. Based Infection Control Pract	3	
MBS 536	Competencies in Infection Control	3	

Core and Subject courses:	27
Thesis (MBS 600)	9
TOTAL CREDIT HOURS REQUIRED	**36**

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
RESC 501	Statistics I	3	Math XX	RESC 502	Res Methodologies	3	RESC 501
RESC 503	Biomedical Ethics	3		MBS 533	Infection Control Progr Design & Management	3	
MBS 531	Basics of Microbiology	3		MBS 534	Environ management	3	
MBS 532	Fund of Epid & Surveill	3					
	TOTAL	**12**			**TOTAL**	**9**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis-A	cc (0)		MBS 600	Thesis-B	9	
MBS 535	Patient care proc & evid based inf control pract	3					
MBS 536	Compet in Inf Control	3					
	TOTAL	**6**			**TOTAL**	**9**	

5.2.5 Molecular & Cell Biology

Curriculum

Credit Hours Required for a Masters of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	15		15
Thesis	9	-	9
Free Electives	-		
Total	33		33

Core Courses (9 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	3	
REC 503	Research Methodologies	3	
REC 504	Biomedical Ethics	3	-

Subject Courses (15 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBS 500	Basics of Molecular & Cell Biology	3	
MBS 501	Topics in Integrated & System Biology	3	
MBS 502	Methods in Molecular & Cellular Biology	3	MBS 500
MBS 503	Signal Transduction I	3	MBS 500
MBS 505	Advanced Biochemistry	3	Biochemistry
MBS	Any other course approved by *Res & Grad Council*		

Core and Subject courses:	24
Thesis (MBS 600)	9
TOTAL CREDIT HOURS REQUIRED	**33**

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
REC 502	Biostatistics	3		REC 503	Research Methodologies	3	
REC 504	Biomedical Ethics	3		MBS 502	Meth in Molec & Cell Biol	3	MBS 500
MBS 500	Basics of Molec & Cell Biol	3		MBS 503	Signal Transduction I	3	MBS 500
MBS 501	Top Integrated & Sys Biol	3		MBS 505	Advanced Biochemistry	3	Biochem
	TOTAL	**12**			**TOTAL**	**12**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis-A	cc (0)		MBS 600	Thesis-B	9	
	TOTAL	**NA**			**TOTAL**	**9**	

5.3 Master Degree in Engineering & Systems Management (MEM)

5.3.1 Thesis Option

Curriculum

Credit Hours Required for a Masters of Engineering & Systems Management

Type of Courses	Compulsory	Elective	Total
Core	18	-	18
Elective (track)	-	6	6
Thesis	9	-	9
Total	27	6	33

Core Courses (6 Courses, 18 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MEM 501	Statistics and Data Analytics	3	
MEM 502	Systems Architecture and Engineering	3	
MEM 503	Project and Program Management of Complex Systems	3	
MEM 504	Advanced Engineering Economics and Cost Analysis	3	
MEM 505	Operations Engineering & Management	3	
MEM 506	Leadership Development for Engineers & Systems Managers	3	

Elective Courses: **Choose 2 courses** (6 Credit Hours)

Track 1: Decision Analysis & Data Analytics

Course No.	Course Name	Cr	Prerequisite
MEM 507	Applied Computation and Data Science	3	MEM 501
MEM 508	Stochastic Methods for Engineers & Systems Managers	3	MEM 505
MEM 509	Systems Modeling and Simulation	3	MEM 505
MEM 510	Decision & Risk Analysis for Engineers & Systems Managers	3	MEM 501
MEM 511	Deterministic Management Science	3	MEM 505
MEM 512	Special Topics I	3	Dept. App.
MEM 513	Special Topics II	3	Dept. App.

Track 2: Manufacturing & Supply Chain Management

Course No.	Course Name	Cr	Prerequisite
MEM 512	Special Topics I	3	Dept. App.
MEM 513	Special Topics II	3	Dept. App.
MEM 514	Logistics and Supply Chain Engineering	3	MEM 505
MEM 515	Advanced Quality Engineering	3	MEM 501
MEM 516	Methodologies for Operational Excellence	3	MEM 505
MEM 517	Production Systems Analysis and Design	3	MEM 505
MEM 518	Warehouse Systems Analysis and Design	3	MEM 505

Track 3: Development of Cyber-Physical Systems

Course No.	Course Name	Cr	Prerequisite
MEM 512	Special Topics I	3	Dept. App.
MEM 513	Special Topics II	3	Dept. App.
MEM 519	Product and Service Development	3	
MEM 520	Rapid Prototyping for Cyber-Physical Systems	3	
MEM 521	Internet of Things	3	
MEM 522	Information Systems Analysis and Design	3	
MEM 523	Telecommunications & Network Systems Analysis & Design	3	

Core and elective courses:	24
Thesis (MEM 600)	9
TOTAL CREDIT HOURS REQUIRED	**33**

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-req
MEM501	Statistics & Data Analytics	3		MEM 504	Adv Eng Econ Cost Analysis	3	
MEM 502	Syst Architecture & Eng	3		MEM 505	Oper Eng & Management	3	
MEM 503	Proj Progr Mngt Comp Syst	3		MEM 506	Leader Dev Eng Sys Mgt	3	
	TOTAL	**9**			**TOTAL**	**9**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-req
MEM	Elective	3		MEM 600	Thesis-B	9	
MEM	Elective	3					
MEM 600	Thesis-A	cc(0)					
	TOTAL	**6**			**TOTAL**	**9**	

5.3.2 Courses-Only Option

Curriculum

Credit Hours Required for a Master of Science in Engineering & Systems Management

Type of Courses	Compulsory	Elective	Total
Core	18	-	18
Elective (track)	-	18	18
Research/Capstone Project	6	-	6
Total	18	24	42

Core Courses (6 Courses, 18 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MEM 501	Statistics and Data Analytics	3	
MEM 502	Systems Architecture and Engineering	3	
MEM 503	Project and Program Management of Complex Systems	3	
MEM 504	Advanced Engineering Economics and Cost Analysis	3	
MEM 505	Operations Management	3	
MEM 506	Engineering Leadership Development	3	

Elective Courses **Choose 6 courses** (18 Credit Hours)

Track 1: Decision Analysis & Data Analytics

Course No.	Course Name	Cr	Prerequisite
MEM 507	Applied Computation and Data Science	3	MEM 501
MEM 508	Stochastic Methods for Engineers & Systems Managers	3	MEM 505
MEM 509	Systems Modeling and Simulation	3	MEM 505
MEM 510	Decision & Risk Analysis for Engineers & Systems Managers	3	MEM 501
MEM 511	Deterministic Management Science	3	MEM 505
MEM 512	Special Topics I	3	Dept. App.
MEM 513	Special Topics II	3	Dept. App.

Track 2: Manufacturing & Supply Chain Management

Course No.	Course Name	Cr	Prerequisite
MEM 512	Special Topics I	3	Dept. App.
MEM 513	Special Topics II	3	Dept. App.
MEM 514	Logistics and Supply Chain Engineering	3	MEM 505
MEM 515	Advanced Quality Engineering	3	MEM 501
MEM 516	Methodologies for Operational Excellence	3	MEM 505
MEM 517	Production Systems Analysis and Design	3	MEM 505
MEM 518	Warehouse Systems Analysis and Design	3	MEM 505

Track 3: Development of Cyber-Physical Systems

Course No.	Course Name	Cr	Prerequisite
MEM 512	Special Topics I	3	Dept. App.
MEM 513	Special Topics II	3	Dept. App.
MEM 519	Product and Service Development	3	
MEM 520	Rapid Prototyping for Cyber-Physical Systems	3	
MEM 521	Internet of Things	3	
MEM 522	Information Systems Analysis and Design	3	
MEM 523	Telecommunications & Network Systems Analysis & Design	3	

Core and elective courses:	36
Research/Capstone Project (MEM 601)	6
TOTAL CREDIT HOURS REQUIRED	**42**

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-req
MEM501	Statistics & Data Analytics	3		MEM 504	Adv Eng Econ Cost Analysis	3	
MEM 502	Syst Architecture & Eng	3		MEM 505	Oper Eng & Management	3	
MEM 503	Proj Progr Mngt Comp Syst	3		MEM 506	Leader Dev Eng Sys Mgt	3	
	TOTAL	**9**			**TOTAL**	**9**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-req
MEM	Track/Elective	3		MEM 601	Res/Capstone Project	6	
MEM	Track/Elective	3		MEM	Track/Elective	3	
MEM	Track/Elective	3		MEM	Track/Elective	3	
MEM	Track/Elective	3					
	TOTAL	**12**			**TOTAL**	**12**	

5.4 Master Degree in Genetic Counselling (MGC)

Curriculum

Credit Hours Required for a Masters of Genetic Counselling

Type of Courses	Compulsory	Elective	Total
Subject	19	-	19
Practicums & Clinical Rotations	17		17
Research/Capstone Project	6	-	6
Clinical Internship	0		0
Total	**42**	**-**	**42**

Subject Courses (19 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MGC 500	Intro to Medical Genetics & Population	2	-
MGC 501	Topics in Genetic Counseling I	2	-
MGC 502	Topics in Genetic Counseling II	2	-
MGC 503	Psychosocial Asp of Genetic Counseling	2	-
MGC 504	Genetic Basis of Inherited Disease	2	-
MGC 505	Cancer Genetic Counseling	2	-
MGC 509	Introduction to Anatomy & Physiology	2	-
MGC 515	Genetic Counseling & Islam	2	-
REC 503	Research Methodology	3	-

Practicums & Clinical Rotations (17 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MGC 506	Biochemical & Newborn Screening	2	
MGC 508	Molecular Genetics Practicum	2	
MGC 510	Observational Clinic Rotation	2	
MGC 511	Medical Genetics Clinic Practicum	3	
MGC 512	Prenatal Clinic Practicum	2	
MGC 513	Advanced Medical Genetics Clinic Practicum	2	
MGC 514	Ultrasound Clinic Practicum	2	
MGC 516	Cytogenetics Laboratory Practicum	2	

Subject and Clinical courses:	36
Research/Capstone Project (MGC 601)	6
Clinical Internship (MGC 517)	0
TOTAL CREDIT HOURS REQUIRED	**42**

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
REC 503	Research Method	3	-	MGC 505	Cancer Gen Counseling	2	-
MGC 500	Intro Pop & Med Gen	2	-	MGC 507	Psyc Asp Gen Counseling	2	-
MGC 502	Top in Gen Counseling I	2	-	MGC 509	Intro Anat & Physiology	2	-
MGC 503	Top in Gen Counseling II	2	-	MGC 515	Gen Counseling & Islam	2	-
MGC 504	Gen Basis Inher Disease	2	-	MGC 506	Bioch& Newb Scr Lab Prac	2	
	TOTAL	**11**			**TOTAL**	**10**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MGC 508	Mol Gen Practicum	2		MGC 514	Ultrasound Clinic Prac	2	
MGC 510	Obs Clinic Rotation	2		MGC 516	Cytogenetics Lab Prac	2	
MGC 511	Med Gen Clinic Prac	3		MGC 601	Res/Capstone Project	6	
MGC 512	Prenatal Clinic Prac	2					
MGC 513	Adv Med Gen Cl Pr	2					
	TOTAL	**11**			**TOTAL**	**10**	

5.5 Master Degree in Nanoscience & Nanotechnology (MNT)

5.5.1 Nano materials for Energy & Environmental Applications

Curriculum

Credit Hours Required for a Masters of Nanoscience & Nanotechnology

Type of Courses	Compulsory	Elective	Total
Core	12	-	12
Subject	12	-	12
Thesis	9	-	9
Total	**33**	**-**	**33**

Core Courses (12 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MNT 510	Introduction to Nanoscience and Nanotechnology I	3	
MNT 520	Introduction to Nanoscience in Nanotechnology II	3	
MNT 530	Experimental Techniques in Nanotech - I	3	
MNT 540	Experimental Techniques in Nanotech - II	3	MNT 510, MNT530

Subject Courses (9 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MNT 511	Renewable Energy Storage Systems	3	
MNT 512	Polymer Nanocomposites	3	MNT 510, MNT530
MNT 513	Topics in Nanomaterials Science	3	MNT 510, MNT530

Choose one Subject Course from below (3 Credit Hours)**:**

Course No.	Course Name	Cr.	Prerequisite
MNT 502	Nano biotechnology	3	
MNT 503	Special topic in Nanomedicine	3	MNT 510, MNT530
MNT 504	Biosensors & Lab on a chip	3	MNT 510, MNT530
Core and Subject courses:		24	
Thesis (MNT 600)		9	
TOTAL CREDIT HOURS REQUIRED		**33**	

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course	**Course Name**	**Cr.**	**PreR**	**Course**	**Course Name**	**Cr**	**Pre-req**
MNT 510	Intr Nanosci & Nanotech I	3		MNT 520	Intr Nanosci Nanotech II	3	
MNT 530	Exp Techn in Nanotech I	3		MNT 540	Exp Techn Nanotech - II	3	MNT 510 MNT 530
MNT 511	Ren Energy Storage Syst	3		MNT 512	Polym Nanocomposites	3	MNT 510 MNT 530
	TOTAL	**9**			**TOTAL**	**9**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course	**Course Name**	**Cr.**	**Pre-req**	**Course**	**Course Name**	**Cr**	**Pre-req**
MNT 600	Research Thesis A	CC(0)		MNT 600	Thesis B	9	
MNT	Subject	3					
MNT 513	Topics Nanomat Sci	3	MNT510, MNT530				
	TOTAL	**6**			**TOTAL**	**9**	

5.5.2 Nanomedicine & Nanodiagnostics

Curriculum

Credit Hours Required for a Masters of Nanoscience & Nanotechnology

Type of Courses	Compulsory	Elective	Total
Core	12	-	12
Subject	12	-	12
Thesis	9	-	9
Total	**33**	**-**	**33**

Core Courses (12 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MNT 510	Intro to Nanoscience & Nanotechnology I	3	
MNT 530	Experimental Techniques in Nanotech - I	3	
MNT 520	Intro to Nanoscience in Nanotechnology II	3	
MNT 540	Experimental Techniques in Nanotech - II	3	MNT 510, MNT530

Subject Courses (9 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MNT 502	Nano biotechnology	3	
MNT 503	Special topic in Nanomedicine	3	MNT 510, MNT530
MNT 504	Biosensors & Lab on a chip	3	MNT 510, MNT530

Choose one Subject Course from below (3 Credit Hours)**:**

Course No.	Course Name	Cr.	Prerequisite
MNT 511	Renewable Energy Storage Systems	3	
MNT 512	Polymer Nanocomposites	3	MNT 510, MNT530
MNT 513	Topics in Nanomaterials Science	3	MNT 510, MNT530
Core and Subject courses:		24	
Thesis (MNT 600)		9	
TOTAL CREDIT HOURS REQUIRED		**33**	

Suggested Study Plan

First Year / Fall Semester				**First Year/Winter Semester**			
Course	**Course Name**	**Cr.**	**PreR**	**Course**	**Course Name**	**Cr**	**Pre-req**
MNT 510	Intr Nanosci Nanotech I	3		MNT 520	Intr Nanosci Nanotech II	3	
MNT 530	Exp Techn in Nanotech I	3		MNT 540	Exp Techn Nanotech II	3	MNT 510 MNT 530
MNT 502	Nano biotechnology	3		MNT 503	Special topic Nanomed	3	MNT 510 MNT 530
	TOTAL	**9**			**TOTAL**	**9**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course	**Course Name**	**Cr.**	**Prereq**	**Course**	**Course Name**	**Cr**	**Pre-req**
MNT 600	Thesis A	CC(0)		MNT 600	Thesis B	9	
MNT	Subject	3					
MNT 504	Biosens Lab on chip	3	MNT510 MNT530				
	TOTAL	**6**			**TOTAL**	**9**	

5.6 Master Degree in Public Health (MPH)

5.6.1 Biostatistics & Epidemiology

Curriculum

Credit Hours required for a Masters of Public Health: courses option

Type of Courses	Compulsory	Elective	Total
Core	18	-	18
Subject	9	-	9
Elective	-	6	6
Practicum	3	-	3
Research/Capstone Project	6	-	6
Seminar	1	-	1
Total	**37**	**6**	**43**

Core Courses (18 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MPH 500	Principles of Biostatistics	3	
MPH 502	Principles of Epidemiology	3	
MPH 503	Environmental and Occupational Health	3	
MPH 504	Communicable Diseases	3	
MPH 505	Non Communicable Disease	3	
MPH 506	Social & Behavioral Determinants of Health	3	

Subject Courses (9 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MPH 507	Advanced Biostatistics	3	MPH 500
MPH 508	Advanced Epidemiology	3	MPH 502
MPH 509	Regression Analysis	3	MPH 500

Elective Courses (Choose 6 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MPH 516	Survival Analysis	3	MPH 500, MPH 502
MPH 517	Categorical Data Analysis	3	MPH 500, MPH 502
MPH 518	Ethics in Research	3	
MPH 519	Public Health & Healthcare Systems in KSA	3	MPH 500, 502
MPH 520	Health Economics	3	MPH 500. 502
MPH 521	Health Informatics	3	MPH 500, 502
MPH 523	Research Design	3	MPH 500, 502

Core and Subject courses:	27	
Elective courses	6	
Practicum (MPH 525)	3	
Res/Capstone Project (MPH 601)	6	
Seminar (MPH 526)	1	
TOTAL CREDIT HOURS REQUIRED	**43**	

Suggested Study Plan

First Year / Fall Semester				First Year/Winter Semester			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**Pre-req**
MPH 500	Principles of Biostatistics	3		MPH 505	Non Communicable Dis	3	
MPH 502	Principles Epidemiology	3		MPH 506	Soc Behav Deter Health	3	
MPH 503	Environ Occupat Health	3		MPH 507	Advanced Biostatistics	3	MPH 500
MPH 504	Communicable Diseases	3		MPH 508	Advanced Epidemiology	3	MPH 502
	TOTAL	**12**			**TOTAL**	**12**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**Pre-req**
MPH 509	Regression Analysis	3	MPH 500	MPH 525	Practicum	3	
MPH	Elective	3		MPH 601	Res/Capstone Project	6	
MPH	Elective	3		MPH 526	Seminar	1	
	TOTAL	**9**			**TOTAL**	**10**	

5.6.2 Mass Gatherings Health (Hajj & Umrah)

Curriculum

Credit Hours required for a Masters of Public Health: courses option

Type of Courses	Compulsory	Elective	Total
Core	18	-	18
Subject	9	-	9
Elective	-	6	6
Practicum	3	-	3
Res/Capstone Project	6	-	6
Seminar	1	-	1
Total	**37**	**6**	**43**

Core Courses (18 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MPH 500	Principles of Biostatistics	3	
MPH 502	Principles of Epidemiology	3	
MPH 503	Environmental and Occupational Health	3	
MPH 504	Communicable Diseases	3	
MPH 505	Non Communicable Disease	3	
MPH 506	Social & Behavioral Determinants of Health	3	

Subject Courses (9 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MPH 510	Principles of Mass Gathering Health	3	MPH 500, 502
MPH 511	Principles of Disaster Management	3	MPH 500, 502
MPH 512	Emerging Infect & Infect Dis Management	3	MPH 505, 502

Elective Courses (Students can choose 6 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MPH 523	Research Design	3	MPH 500
MPH 524	Nutrition	3	
MPH 518	Ethics in Research	3	
MPH 519	Public Health & Healthcare Syst in KSA	3	MPH 500, 502
MPH 520	Health Economics	3	MPH 500. 502
MPH 521	Health Informatics	3	MPH 500, 502
MPH 522	Global Health	3	

Core and Subject courses:	27
Elective courses	6
Practicum (MPH 525):	3
Res/Capstone Project (MPH 601)	6
Seminar (MPH 526)	1
TOTAL CREDIT HOURS REQUIRED	**43**

Suggested Study Plan

First Year / Fall Semester				First Year/Winter Semester			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**Pre-req**
MPH 500	Princ Biostatistics	3		MPH 505	Non Communic Dis	3	
MPH 502	Princ Epidemiology	3		MPH 506	Soc Behav Deter Health	3	
MPH 503	Env Occupat Health	3		MPH 510	Princ Mass Gath Health	3	MPH500, 502
MPH 504	Communicable Dis	3		MPH 511	Princ Disaster Manag	3	MPH500, 502
	TOTAL	**12**			**TOTAL**	**12**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**Pre-req**
MPH 512	Em Infect Dis Manag	3	MPH505, 502	MPH 525	Practicum	3	
MPH	Elective	3		MPH 601	Res/Capstone Project	6	
MPH	Elective	3		MPH 526	Seminar	1	
	TOTAL	**9**			**TOTAL**	**10**	

5.6.3 Health Policy & Management

Curriculum

Credit Hours required for a Masters of Public Health: courses option

Type of Courses	Compulsory	Elective	Total
Core	18	-	18
Subject	9	-	9
Elective	-	6	6
Practicum	3	-	3
Res/Capstone Project	6	-	6
Seminar	1	-	1
Total	**37**	**6**	**43**

Core Courses (18 Credit Hours)

Course	Name	Cr	Prerequisite
MPH 500	Principles of Biostatistics	3	
MPH 502	Principles of Epidemiology	3	
MPH 503	Environmental and Occupational Health	3	
MPH 504	Communicable Diseases	3	
MPH 505	Non Communicable Disease	3	
MPH 506	Social & Behavioral Determinants of Health	3	

Subject Core Courses (9 Credit Hours)

Course	Name	Cr	Prerequisite
MPH 513	Health Policy	3	MPH 500, 502
MPH 514	Quality Assurance in Public Health	3	MPH 500, 502
MPH 515	Healthcare Management	3	MPH 500, 502

Elective Courses (Students choose 6 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MPH 523	Research Design	3	MPH 500
MPH 524	Nutrition	3	
MPH 518	Ethics in Research	3	
MPH 519	Public Health and Healthcare Systems in KSA	3	MPH 500, 502
MPH 520	Health Economics	3	MPH 500. 502
MPH 521	Health Informatics	3	MPH 500, 502
MPH 522	Global Health	3	

Core and Subject courses:	27
Elective courses	6
Practicum (MPH 525):	3
Res/Capstone Project (MPH 601)	6
Seminar (MPH 526)	1
TOTAL CREDIT HOURS REQUIRED	**43**

Suggested Study Plan

First Year / Fall Semester				First Year/Winter Semester			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**Pre-req**
MPH 500	Principles of Biostatistics	3		MPH 505	Non Communicable Dis	3	
MPH 502	Principles Epidemiology	3		MPH 506	Soc Behav Deter Health	3	
MPH 503	Environ Occupat Health	3		MPH 513	Health Policy	3	MPH 500, 502
MPH 504	Communicable Diseases	3		MPH 514	Qual Assur Publ Health	3	MPH 500, 502
	TOTAL	**12**			**TOTAL**	**12**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**Pre-req**
MPH 515	Health Sys Manag	3	MPH500,2	MPH 525	Practicum	3	
MPH	Elective	3		MPH 601	Res/Capstone Project	6	
MPH	Elective	3		MPH 526	Seminar	1	
	TOTAL	**9**			**TOTAL**	**10**	

5.7 Master Degree in Radiological and Imaging Sciences (MRS)

5.7.1 Radiologic Education

Curriculum

Credit Hours required for a Masters of Radiological & Imaging Sciences

Type of Courses	Compulsory	Elective	Total
Core	24	-	24
Subject	12	-	12
Research/Capstone Project	6	-	6
Total	**42**	**-**	**42**

Core Courses (24 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MRS 500	Radiation Counting Statistics	3	
MRS 502	Radiological Research	3	
MRS 503	Ethics in Radiology	2	
MRS 504	Radiological & Imaging Sciences I	3	
MRS 505	Radiological & Imaging Sciences II	3	
MRS 506	Topics in Medical Imaging	3	
MRS 507	Topics in Radiation Therapy	3	
MRS 508	Topics in Nuclear Medicine	3	
MRS 509	RIS Seminar	1	

Subject Courses (12 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MRS 510	Academic Program Management	3	
MRS 511	Faculty Development	3	
MRS 512	RIS Instruction & Assessment	3	
MRS 513	RIS Academic Program Accreditation	3	

Core and Subject courses:	36
Res/Capstone Project (MRS 601)	6
TOTAL CREDIT HOURS REQUIRED	**42**

Suggested Study Plan

First Year / Fall Semester				First Year/Winter Semester			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**PreR**
MRS 500	Radiation Counting Statistics	3		MRS 503	Ethics in Radiology	2	
MRS 502	Radiological Research	3		MRS 506	Topics Med Imaging	3	
MRS 504	Radiol & Imaging Sciences I	3		MRS 507	Topics Rad Therapy	3	
MRS 505	Radiol &Imaging Sciences II	3		MRS 508	Topics Nuclear Med	3	
				MRS 509	RIS Seminar	1	
	TOTAL	**12**			**TOTAL**	**12**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course	**Name**	**Cr.**	**Pre-req**	**Course**	**Name**	**Cr**	**PreR**
MRS 510	Academic Program Management	3		MRS 513	RIS Acad Prog Accr	3	
MRS 511	Faculty Development	3		MRS 601	Res/Capst Project	6	
MRS 512	RIS Instruction & Assessment	3					
	TOTAL	**9**			**TOTAL**	**9**	

5.7.2 Radiologic Management

Curriculum

Credit Hours required for a Masters of Radiological & Imaging Sciences

Type of Courses	Compulsory	Elective	Total
Core	24	-	24
Subject	12	-	12
Research/Capstone Project	6	-	6
Total	**42**	**-**	**42**

Core Courses (24 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MRS 500	Radiation Counting Statistics	3	
MRS 502	Radiological Research	3	
MRS 503	Ethics in Radiology	2	
MRS 504	Radiological & Imaging Sciences I	3	
MRS 505	Radiological & Imaging Sciences II	3	
MRS 506	Topics in Medical Imaging	3	
MRS 507	Topics in Radiation Therapy	3	
MRS 508	Topics in Nuclear Medicine	3	
MRS 509	RIS Seminar	1	

Subject Courses (12 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MRS 514	Radiologic Financial Management	3	
MRS 515	Personnel Management in Radiology	3	
MRS 516	Clinical Accreditation and QM	3	
MRS 517	Professional Development	3	

Core and Subject courses:	36
Res/Capstone Project (MRS 601)	6
TOTAL CREDIT HOURS REQUIRED	**42**

Suggested Study Plan

First Year / Fall Semester				First Year/Winter Semester			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**PreR**
MRS 500	Radiation Counting Statistics	3		MRS 503	Ethics in Radiology	2	
MRS 502	Radiological Research	3		MRS 506	Topics Med Imaging	3	
MRS 504	Radiol & Imaging Sciences I	3		MRS 507	Topics Rad Therapy	3	
MRS 505	Radiol &Imaging Sciences II	3		MRS 508	Topics Nuclear Med	3	
				MRS 509	RIS Seminar	1	
	TOTAL	**12**			**TOTAL**	**12**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course	**Name**	**Cr.**	**Pre-req**	**Course**	**Name**	**Cr**	**PreR**
MRS 514	Radiologic Financial Management	3		MRS 517	Prof Development	3	
MRS 515	Pers Management in Radiology	3		MRS 601	Res/Capst Project	6	
MRS 516	Clinical Accreditation and QM	3					
	TOTAL	**9**			**TOTAL**	**9**	

5.7.3 Ultrasound

Curriculum

Credit Hours required for a Masters of Radiological & Imaging Sciences

Type of Courses	Compulsory	Elective	Total
Core	24	-	24
Subject	12	-	12
Research/Capstone Project	6	-	6
Total	**42**	**-**	**42**

Core Courses (24 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MRS 500	Radiation Counting Statistics	3	
MRS 502	Radiological Research	3	
MRS 503	Ethics in Radiology	2	
MRS 504	Radiological And Imaging Sciences I	3	
MRS 505	Radiological And Imaging Sciences II	3	
MRS 506	Topics in Medical Imaging	3	
MRS 507	Topics in Radiation Therapy	3	
MRS 508	Topics in Nuclear Medicine	3	
MRS 509	RIS Seminar	1	

Subject Courses (12 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MRS 518	Ultrasound Physics	3	
MRS 519	Sonography Cross-Sectional Anatomy	3	
MRS 520	Abdominal Sonography	3	
MRS 521	Pelvic Sonography	3	
MRS 522	Obstetrical Sonography	3	
MRS 523	Clinical Sonography	3	
MRS 524	Sonography Procedures	3	
MRS 525	Sonographic Musculoskeletal, Neonatal & Pediatric MRS	3	
MRS 526	Sonographic Vascular & Postoperative Imaging	3	
MRS 527	Echocardiography Imaging	3	

Core and Subject courses:	36
Res/Capstone Project (MRS 601)	6
TOTAL CREDIT HOURS REQUIRED	**42**

Suggested Study Plan

First Year / Fall Semester				First Year/Winter Semester			
Course	**Name**	**Cr.**	**PreR**	**Course**	**Name**	**Cr**	**PreR**
MRS 500	Radiation Counting Statistics	3		MRS 503	Ethics in Radiology	2	
MRS 502	Radiological Research	3		MRS 506	Topics Med Imaging	3	
MRS 504	Radiol & Imaging Sciences I	3		MRS 507	Topics Rad Therapy	3	
MRS 505	Radiol &Imaging Sciences II	3		MRS 508	Topics Nuclear Med	3	
				MRS 509	RIS Seminar	1	
	TOTAL	**12**			**TOTAL**	**12**	
Second Year / Fall Semester				**Second Year/ Winter Semester**			
Course	**Name**	**Cr.**	**Pre-req**	**Course**	**Name**	**Cr**	**PreR**
MRS	Subject	3		MRS	Subject	3	
MRS	Subject	3		MRS 601	Res/Capst Project	6	
MRS	Subject	3					
	TOTAL	**9**			**TOTAL**	**9**	