



# Graduate Catalog

PROGRAMS, CURRICULA & STUDY PLANS

**2022-2023**

Graduate School

31 January 2023 mg/rf

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## 1. Introduction

Current graduate programs, courses & study plans are presented in this catalog. It has been prepared by the Graduate School in coordination with the Graduate Program Directors and Co-Directors in each College. The catalog is updated on a yearly basis.

### 1.1. How to use this Catalog

This catalog describes what is available and what is expected to complete a program of study successfully. It is essential for planning one's academic experiences and can be most useful when supplemented with faculty advising and guidance. 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.

While the information in this catalog is current at the time of publication, Alfaisal University reserves the right to change or delete any of its courses of study, course offerings, schedule, and other changes, policies, or programs of the University at any time and without any notice. General academic policies are published in the *Graduate Policies & Procedures* and forms a companion to the programs, curricula and study plans outlined in the *Graduate Catalog*. Both documents are available online through the Graduate School web site <https://research.alfaisal.edu/graduate-school>.

A candidate for a degree may choose to graduate under the regulations of the catalog and policies & procedures in force at the time of enrolment or any subsequent catalog, provided that the catalog chosen is not more than seven years old. A student must have been enrolled under the catalog selected and must conform to the degree requirements of that catalog.

While Alfaisal University is committed to academic quality, the University is not able to guarantee that a student's pursuit of a particular course of study will result in any profession or occupation, or admission to other undergraduate or graduate courses of study at other institutions. Advisors and college officials make every effort to provide current information to students, but it is the student's responsibility to know all applicable policies and degree requirements.

### 1.2. University Profile

#### 1.2.1. Historical Context

The King Faisal Foundation (KFF) which was established in 1976 by the heirs of the late King Faisal, launched Alfaisal University as the premier coeducational institution for business, engineering, science, and medical education and research in the Kingdom and the region. The deeply held principle of KFF was that a well-

educated population was the foundation for a strong nation. The Foundation has always promoted a pragmatic approach to furthering the opportunities for Saudi youth. The creation of a university that strives to achieve excellence in several fields is yet another important advance towards fulfilling its desire to enrich the country's enterprising individuals with the ability to compete on a global level. Financial support provided by the King Faisal Foundation has also produced the King Faisal School, Prince Sultan College for Tourism and Business, and Effat College (for women).

Plans for establishing Alfaisal University began in 1999. The first "Concept Paper" regarding the University was prepared in late 2000 with the support of the Carlyle Group. It was submitted to the Economic Offset Committee in February 2001 to qualify the University under the Economic Offset Program. Approval was received in July 2001. Four non-Saudi multinational companies agreed to become co-founders along with six Saudi organizations. In April 2003, the Offset Committee granted a multiple of eight offset credits to the non-Saudi co-founders for cash contributions. The Board of Trustees negotiated with the Ministry of Higher Education to secure an acceptable Charter that assured the independence of the University. The Charter (#10905) was approved by the Ministry on 10 July 2004 and unanimously ratified by the Board of Trustees on 25 October 2004.

The campus is situated on the beautiful grounds of the late King Faisal's Palace at Al Maathur in the centre of Riyadh, a historical location ideal for academic pursuits. The first two campus buildings (Science and Business) were completed in 2008 and 2009, respectively. Students began University studies in Engineering, Business, and Medicine in October 2008 with majors in the College of Science and General Studies beginning in 2011. A College of Pharmacy was added in 2015, and a College of Law & International Relations in 2021. A Master of Business Administration (MBA) was initiated in 2010 and other graduate degrees in Engineering and Medicine were launched in 2012. The first females were admitted in September 2011. Today, the colleges of business, engineering, science, and medicine offer graduate programs.

#### *1.2.2. Research, Innovation & Graduate Studies at Alfaisal University*

Alfaisal was established with the aim of being a private not-for-profit world-class university that offers its students the latest knowledge in a state-of-the-art environment. Alfaisal espouses all the noble virtues that form the bedrock of the Foundation's educational activities: to promote learning, research, and the implementation of technology in a manner that promotes the Kingdom's employment and career objectives for its citizens. Education at Alfaisal is international in approach with instruction in the English language. The programs are student-centred, utilize problem-based learning and foster team-based skills. Alfaisal will

enable its graduates to gain internationally recognized qualifications through an exclusive education imparted to them from within the Kingdom itself.

326The Office of Research & Innovation and the Graduate School are primarily service organizations for all colleges within Alfaisal University. This assistance is offered at three distinct, yet complementary levels: graduate studies, innovative research ventures, and entrepreneurial activities. Support is provided to colleges in developing new graduate programs and passing them through the internal & external approval processes. Oversight is also performed on current programs & graduate students to ensure that Ministry of Education (MOE) & National Accreditation (NCAAA) guidelines are met and followed. Assistance is given to faculty in the search for external funding and in the management of awarded grants and contracts. Entrepreneurial activities are encouraged through generation of intellectual property (IP), new product development, collaboration with industry, and training of graduate students.

#### 1.2.3. *Vision & Mission*

Vision: To be a world-class non-profit research university and a pioneer in innovation and knowledge applications.

Mission: To create and disseminate knowledge by offering world-class graduate programs, cutting-edge innovative research, and outreach activities that serve national development and benefit humanity.

#### 1.2.4. *Accreditation*

The University has been fully accredited by the *National Centre for Academic Accreditation and Evaluation (NCAAA)*.

## 2. Graduate Programs

Alfaisal University currently offers ten graduate programs. The programs and their tracks, if applicable, are outlined below.

### 2.1 Master of 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, analytical, critical thinking, management, 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 *Accounting & Taxation*: The program aim is to educate modern decision makers who are not only technically competent in accounting and taxation but are also proficient in making decisions based on practical, analytical, reflective, and critical thinking considerations.
- 2.1.3 *Digital Marketing*: The program goal is to educate market-oriented leaders who will add value to businesses, locally and worldwide, by making sound marketing management decisions based on analytical and theoretical considerations.
- 2.1.4 *Finance*: The MBA Finance track 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 various contemporary finance issues. It is flexible and affords students the opportunity to select from a variety of finance elective courses allowing customization of the MBA-Finance experience to fit specific career needs.
- 2.1.5 *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.
- 2.1.6 *Human Capital Management*: The expected growth in the economy, the urgent need for the effective implementation of Saudization initiatives to meet its objectives, as well as the pressure to reduce unemployment among a young population, will intensify the demand for qualified leadership and human capital managers. To attend to these growing market needs, the *Human Capital Management* track is designed to prepare graduates to lead management and development initiatives across organizations in the Kingdom of Saudi Arabia. Graduates will develop expertise in talent and human capital functions including, the application of progressive leadership behaviours to enable organizational change and development, creating HR strategies and plans, conducting workforce analysis, and human capital recruitment and selection.

## **2.2 Master of 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 six 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 Anatomy*: The program is focused on the study of gross anatomy, histology, neuroanatomy, and embryology. It deals with the clinical application of anatomical disciplines. The program offers a broad range of fundamental courses including techniques of molecular biology, biostatics, and research methodology. It is also research intensive and provides several basic science laboratory exercises as well as practical research experience in molecular biology, cell biology and medical education.
- 2.2.4 *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)
- 2.2.5 *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)
- 2.2.6 *Laboratory Quality Management*: Graduate students are introduced to medical laboratory quality management along with research methods and presentation skills. This program includes a research thesis and focuses on the principles of quality management systems and their applications in a clinical laboratory. Likewise, it prepares medical technologists for the management of a clinical laboratory.
- 2.2.7 *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.
- 2.2.8 *Transfusion Medicine & Stem Cells*: This program focusses on principles of transfusion medicine, red blood cell biochemistry, basic genetics, stem cells transplantation and biology. It involves an introduction to quality management systems and their applications in the blood transfusion process. In addition, the program aims to strengthen the principles of research and presentation skills (oral and written presentation skills), as well as to improve the clinical practice.

## **2.3 Master of Cardiac Nursing (MCN)**

Alfaisal University College of Medicine in collaboration with the Prince Sultan Cardiac Centre (PSCC) is offering a 42-credit two-year Master of Cardiac Nursing (MCN) program consisting of lectures, clinical courses, and a capstone project. This specialty Nursing master's degree is a response to the need within the healthcare sector and will be supported by scholarships from PSCC.

This master's degree is designed to advance registered nurses' cardiac knowledge and skills enabling them to meet contemporary challenges in advanced cardiac nursing. Participation in the program will develop understanding of the nursing and medical care requirements for all levels of adult and paediatric patient complexity and assist the registered nurse to integrate theory into practice supporting both academic and clinical competence. By enhancing the theoretical knowledge and the practical abilities, qualified cardiac registered nurses' graduates will be able to deliver adept clinical assessment, decision making and patient management skills, while supporting the imperative of evidence-based practice more effectively. The Master of Cardiac Nursing will enable graduate nurses to develop their professional autonomy while providing role models, as well as educational and leadership support for junior staff.

## **2.4 Master of Clinical Psychology (MCP)**

The Master of Clinical Psychology is offered academically by the College of Medicine in collaboration with King Fahad Medical City (KFMC) for the clinical aspect of the degree. The courses of the Master program of Clinical Psychology are designed as a practical program and includes a research/capstone project. Most of the courses have a practical element which will be applied at the Mental Health Department of the National Neuroscience Institute in King Fahad Medical City.

## **2.5 Master of Clinical Speech- Language Pathology (MSP)**

A Speech Language Pathologist (SLP) is an allied health professional that works to "identify, help prevent, assess, diagnose, and treat a wide range of disorders affecting speech, language, social communication, cognitive-communication, and swallowing in children and adults". According to the American Speech and Hearing Association (ASHA), SLPs "work with the full range of human communication and swallowing disorders in individuals of all ages from new-born to the elderly. Having Speech Language Pathologist in a developing country is of primary importance since whereas swallowing is vital to sustain an individual's life, language is the mental and spiritual mean by which one can connect and communicate with others. Therefore, there is a need to develop professionals who have the skills and knowledge to tackle these disorders, and in addition carry out cultural and linguistically valid research to develop Saudi Arabian normative data as well as valid and reliable assessment and therapy protocols.

The master's in clinical Speech Language Pathology is offered academically by the College of Medicine at Alfaisal University. The Speech Language Pathology Clinic at King Faisal Specialist Hospital & Research Centre will carry out the clinical aspects of the degree. The courses are designed based

on several educational pillars; in classroom taught courses and supervised clinical practice along with either a project or a thesis. Successful completion of these core elements leads to a graduate as a specialized speech therapy practitioner.

## **2.6 Master of 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.

## **2.7 Master of 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*.

## **2.8 Master of Nanoscience & Nanotechnology (MNT)**

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

## **2.9 Master of Public Health (MPH)**

This is a two-year program consisting of both thesis and courses-only options and was designed for working physicians, residents, fellows, public health officials, policy makers and college graduate students interested in public health. Students can 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*.

## **2.10 Master of Radiological & Imaging Sciences (MRS)**

The program which is open to training men and women, Saudi and non-Saudi, local and international students, is designed in two specialization

tracks: Radiological & Imaging Sciences (Education & Management) and Ultrasound. Both tracks are courses-only option. The Saudi Commission for Health Specialties (SCFHS) has certified (Hajri 14/04/1438) the main track *Radiological & Imaging Sciences*. The *Ultrasound* track has been submitted

**2.10.1 *Radiological & Imaging Sciences (Education & Management):***  
Aims to prepare and train lecturers in undergraduate and technical supervisors, managers of radiologic and imaging services. 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. Also, will Prepares at free standing imaging centres, hospitals and/or major medical centres. The focus is on technical management and educations of imaging and related services quality assurances, including clinical service accreditation by the ABR and other comparable accreditation organizations.

**2.10.2 *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 College of Medicine.

## **2.11 Master of Science in Applied Health Research (MAR)**

The Master of Science in Applied Health Research (MAR) at the College of Medicine will provide scientists and clinicians with training in biomedical statistical methodology. Advanced statistical techniques will be combined with practical lab-based training. The R statistical language will be used for programming and analyses, conveniently taught through RStudio and Jamovi. This Master program is aimed at creating frontline researchers in Health science.

## **2.12 Master of Science in Health Research Management (MRM)**

The Master of Health Research Management (MRM) program at Alfaisal will provide experienced health science professionals with updated skills, strategies, and resources for developing and managing products, treatment protocols, and other processes associated with clinical research and patient care.

### 3 List of Graduate Courses

Course Code	Course Title
<i>Master of Business Administration</i>	
MBA 510	Financial Accounting
MBA 511	Quantitative Analysis
MBA 512	Marketing Management
MBA 513	Managerial Economics
MBA 514	Organizational Behavior
MBA 515	Business Analytics
MBA 516	Managerial Finance
MBA 517	Communication & Writing for Accountants
MBA 518	Human Resource Management
MBA 519	Strategic Management
MBA 520	Internal Control, Audit & Fraud Prevention & Detection
MBA 521	Advanced Topics in Financial Reporting
MBA 522	Operations Strategy
MBA 523	Taxation of Business Entities
MBA 524	International Taxation
MBA 525	Zakat
MBA 526	Sales & Value Added Tax
MBA 527	Marketing Intelligence
MBA 528	Managerial Accounting
MBA 529	Marketing Strategy
MBA 530	Managing Strategic Business Projects
MBA 531	Marketing Research Project
MBA 532	Supply Chain Management
MBA 534	Leading Organizational Change
MBA 535	Applied Business Research Project
MBA 536	Digital & Social Media Marketing
MBA 537	Global Marketing
MBA 538	Entrepreneurship and Innovation
MBA 540	Islamic Finance
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 549	Corporate Finance
MBA 550	Service Marketing
MBA 551	Derivative Securities
MBA 553	Bank Management
MBA 555	Corporate Governance, Business Ethics & CSR
MBA 558	Value Innovation Strategy
MBA 560	Healthcare Management
MBA 561	Investment & Portfolio Theory
MBA 562	Health Informatics
MBA 563	Management Control & Performance Measurement
MBA 565	HR Development & Performance
MBA 567	Practicum & Seminar
MBA 568	Financial Econometrics
MBA 570	Risk Management
MBA 571	Integrated Marketing Communications
MBA 573	Applied Econometrics
MBA 574	Global Economics
MBA 575	Negotiations

MBA 580	Consumer Behavior & Insights
MBA 581	Managerial Decision Making
MBA 582	Total Quality Management
MBA 584	Organizational Theory
MBA 585	Leadership in Organizations: Principles & Practices
MBA 590	Real Estate Analysis
MBA 591	Insurance

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### *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 506	Human Gross Anatomy
MBS 507	Clinical Embryology
MBS 508	Human Neuroanatomy
MBS 509	Histology and Cell Biology
MBS 510	Clinical Rotation in Surgery, Radiology and Pathology
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 554	Transfusion Medicine and Blood Banking
MBS 555	Molecular Diagnostics in Blood Transfusion
MBS 556	Stem cell Transplantation Technology
MBS 557	Pathogenesis of Blood Disorders
MBS 558	Quality Management & Laboratory Accreditation
MBS 560	Method Comparison & Validation
MBS 600	Thesis
REC 502	Biostatistics
REC 503	Research Methodologies
REC 504	Biomedical Ethics

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### *Master of Cardiac Nursing*

MCN 511	Cardiovascular Pulmonary 1
MCN 512	Cardiology Diseases
MCN 514	Quality and Safety Consideration in Nursing Care
MCN 521	Cardiovascular Pulmonary 2
MCN 522	Clinical Cardiology (Paediatrics, Adults) & Intensive Care
MCN 523	Evidence-based Practice
MCN-C 531	Clinical Paediatric Cardiology
MCN-C 532	Clinical Adult Cardiology
MCN-C 533	Clinical Cardiac Surgery
MCN-C 534	Clinical Cardiac Intensive Care

MCN 601	Capstone Project
REC 503	Research Methodologies
REC 504	Biomedical Ethics

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### *Master of Clinical Psychology*

MCP 500	Neuropsychology
MCP 501	Clinical Psychology
MCP 502	Schools of Psychotherapies
MCP 503	Case Formulation
MCP 504	Assessment and Clinical Interview
MCP-505	Cognitive Behavioral Therapy
MCP-C 506	Neurorehabilitation Unit
MCP-C 507	Child and Adolescent Psychology Unit
MCP-C 508	Neuropsychology Unit
MCP-C 509	Adult Psychology Unit
MCP 601	Research/Capstone Project

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### *Master of Clinical Speech- Language Pathology*

MSP 500	Clinical Methods and Ethical Considerations
MSP 501	Feeding and Swallowing Disorders
MSP 502	Fluency and Speech Sounds Disorders
MSP 503	Neurogenic Acquired Communication Disorders
MSP 504	Alternative & Augmented Communication
MSP 505	Developmental Language Disorders
MSP 509	Principles of Voice Production & Disorders
MSP 514	Practicum I: Paediatric Populations
MSP 515	Practicum II: Adult Populations
MSP 516	Practicum III: Specialized Populations
MSP 601	Capstone Project
REC 502	Biostatistics
REC 503	Research Methodologies

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### *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 524	Artificial Intelligence

MEM 525	Machine Learning
MEM 526	Advanced Big data
MEM 527	Industrial Internet of Things (IIoT)
MEM 600	Thesis
MEM 601	Research/Capstone Project

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### *Master of Genetic Counselling*

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 Clinic 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 518	Introduction to Medical & Population Genetics I
MGC 519	Introduction to Medical & Population Genetics II
MGC 601	Research/Capstone Project

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### *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 551	Cancer mechanisms as therapy targets
MNT 552	Advanced Topic in Cancer Biology and Theranostics
MNT 553	Cancer Genomics and Bioinformatics
MNT 600	Thesis
REC 503	Research Methodologies

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### *Master of Public Health*

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 527	Communicable & Non-Communicable Diseases
MPH 600	Thesis
MPH 601	Research/Capstone Project
REC 502	Biostatistics

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### *Master of Radiological & Imaging Sciences*

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	Musculoskeletal, Neonatal & Pediatric Sonography
MRS 526	Sonographic Vascular & Postoperative Imaging
MRS 527	Echocardiography Imaging
MRS 601	Research/Capstone Project
REC 502	Biostatistics

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### *Master of Science in Applied Health Research*

MAR 501	Advanced Statistics
MAR 502	Clinical Trials
MAR 503	Clinical Data Management
MAR 504	Real Data Analysis
MAR 505	Qualitative Research Methods
MAR 506	Systematic Review & Meta Analysis
MPH 502	Principles of Epidemiology
MPH 521	Health Informatics
MAR 600	Thesis
MAR 601	Research/Capstone Project
REC 502	Biostatistics
REC 504	Biomedical Ethics

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*Master of Science in Health Research Management*

MPH 502	Principles of Epidemiology
MPH 521	Health Informatics
MRM 501	Clinical Research Management Fundamentals
MRM 502	Law in Healthcare Delivery; Compl, legal, & reg issues
MRM 503	Fundamentals of Device and Drug Development
MRM 504	Ethical Conduct and Review Board
MRM 505	Financial Management of Research
MRM 506	Leadership and Quality Management in Research
MRM 600	Thesis
MRM 601	Research/Capstone Project
REC 502	Biostatistics
REC 504	Biomedical Ethics

## 4. Course Descriptions

### 4.1. Master of Business Administration

#### **MBA 510            Financial Accounting**

**Cr Hr: 3    Prereq: MBA 511 or PMBA 505 (Intro to Account & Fin)    Grad Scheme: Letter**

At the end of this course, students will be able to analyse and interpret financial data and information and appreciate the consequences of their financial decisions. Students will study the assumptions and concepts underlying financial reporting, using the basic accounting equation, accounting adjustments and interpretations of the income statement, balance sheet, and statement of cash flow. The students will also explore topics such as earnings management and various other issues that permeates business operations.

#### **MBA 511            Quantitative Analysis**

**Cr Hr: 3            Prerequisite: None            Grad Scheme: Letter**

At the end of this course, students will be able to explain quantitative and optimization methods and their applications in businesses. Emphasis will be put on demonstrating the uses, capabilities, and limitations of various mathematical models and statistical procedures for the purposes of exploring, summarizing and presenting data, as well as interpreting the results of statistical procedures and tests to make informed business decisions.

#### **MBA 512            Marketing Management**

**Cr Hr: 3            Prerequisite: None            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. Students will demonstrate and evaluate current approaches in marketing, consumer decision making, the marketing environment, product management, pricing decisions, distribution systems, integrated marketing communications, and managing the marketing effort. Key strategic concepts and processes are emphasized using lectures, case studies, client presentations, and through the development of marketing plans.

#### **MBA 513            Managerial Economics**

**Cr Hr: 3            Prerequisite: None.            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 knowledge to explain and evaluate solutions to various challenges facing a modern organization. The focus will be upon translating management and organizational behaviour theory to practices that result in organizational effectiveness, efficiency, and human resource development. In addition, students will be able to apply and analyse material to interpret, justify, and evaluate behaviour in simulated or live organisational applications.

### **MBA 515 Business Analytics**

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

The objective of this course is to deepen students' understanding of basic tools, concepts, and methodologies related to business analysis and to enhance students' critical thinking and analytical skills. Students will learn to use computer tools including Excel, STATA, SPSS, COGNOS and/or TABLEAU in applying statistical methodologies related to applied problems commonly encountered in today's business environment. In addition, the course will enhance students' abilities to present complex business topics to diverse audiences and help integrate quantitative business analytics into their decision-making.

### **MBA 516 Managerial Finance**

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

At the end of this course, students will understand the language and tools of finance as they relate to a modern business environment. The course will provide students with the capacity to understand relevant theories, as well as applying the tools and techniques to real world situations. Students will be able to value bonds and stocks, estimate asset returns according to their risk characteristics, and choose projects that maximize share-and stakeholder wealth. They will also develop a good understanding of firm valuation and how firms finance their capital expenditures.

### **MBA 517 Communication & Writing for Accountants**

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

Emphasizes analysing business situations and preparing written and oral reports including informational reports, problem-solving reports, and formal analytical reports. Students will analyse accounting situations to identify problems and factors relevant to understanding and make a recommendation to propose a course of action.

### **MBA 518 Human Resource Management**

**Cr Hr: 3 Prerequisite: None 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 in managing 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 and commitment.

### **MBA 519 Strategic Management**

**Cr Hr: 3 Prereq: MBA 514, MBA 515, MBA 516 and MBA 522 Grad Scheme: Letter**

At the end of this course, students will be able to understand and evaluate key concepts, tools, and principles of strategy formulation as they relate to internal firm characteristics and external competitive environment. This course serves as an integrative capstone course that seeks to provide a comprehensive examination of organizations using tools such as environmental scanning, corporate response to environmental change and sustainability, strategic and ethical behaviour, and industry analysis. The course is structured to foster analytical, reflective, and verbal skills, and to expose students to the intricacies of organizational decision-making within a global context.

### **MBA 520 Internal Controls, Audit & Fraud Prevention & Detection**

**Cr Hr: 3 Prerequisites: MBA 516 Grad Scheme: Letter**

Students learn about the auditing function and how to conduct an audit, including evaluation of internal controls, analytical testing, substantive testing, and other methods to help minimize exposure to misstatements, irregularities, losses, and risk. The course is

structured to enhance the student's ability to understand, find and correct misstatements, irregularities, losses and to assess risks that may exist in the firm's operating environment.

### **MBA 521            Advanced Topics in Financial Reporting**

**Cr Hr: 3            Prerequisites: MBA 516    Grad Scheme: Letter**

Utilization of strategic, analytical, and critical thinking skills to investigate financial accounting issues. Through the analysis of intra-disciplinary cases, students show that they have the relevant research skills and technological sophistication to access, evaluate and interpret relevant information needed for decision making.

### **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. Emphasis in this course includes capacity and location planning, layout planning, resource planning, scheduling, supply chain, forecasting, inventory control, and quality assurance.

### **MBA 523            Taxation of Business Entities**

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

A comprehensive study of corporate income taxation and also their major shareholders. Emphasis placed on reading and interpreting tax laws to determine the tax consequences of completed transactions and generate tax planning strategies for future taxations. Emphasis is placed on understanding how taxes relate to business decisions and planning.

### **MBA 524            International Taxation**

**Cr Hr: 3            Prerequisite: MBA 523            Grad Scheme: Letter**

Explores the application of international tax law relevant to entities conducting international transactions, as well as foreign individuals and entities conducting domestic transactions. Topics include the distinction between domestic and foreign-source income, taxation of foreign corporations, international tax treaties, taxation of cross-border acquisitions, and transfer pricing.

### **MBA 525            Zakat**

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

This course includes studying the major characteristics of Zakat and taxation, including the estimation process of Zakat and taxation according to the Saudi Law. Additional topics include settlement of cases related to zakat disputes. The course emphasizes the link between theory and practice.

### **MBA 527            Marketing Intelligence**

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

This course demonstrates the benefits of using a systematic and analytical approach to marketing decision making. An analytical perspective will enable students to understand how firms can systematically evaluate their strategies for managing the specific opportunities and challenges posed by analytics-driven decision making in today's data era. It will further prepare them to use and execute data analytic techniques on real-life company data and case studies to understand how to solve marketing analytics problems in a scientific and process-driven manner. More specifically, the course will provide a gentle introduction to analytic techniques such as customer choice analysis, conjoint analysis, customer lifetime value analysis, segmentation analysis, and structural equation modelling. After successful completion of this course, students will be well equipped to

make return on investment cases for marketing expenditures, which companies are increasingly requesting from their executives.

### **MBA 528                      Managerial Accounting**

**Cr Hr: 3    Prereq: (MBA 511 for Acc & Tax track, MBA 510 for rest of tracks )    Grad Scheme: Letter**

At the end of this course, students will be able to understand the role of accounting information systems in managerial decision-making and strategy execution. Students will learn how business managers use cost behaviour and cost analysis to enhance profitability of their products, services and customers. Students will also learn how managers use financial and non-financial information to improve processes and develop strategies and value drivers to attain sustainable competitive advantages.

### **MBA 529                      Marketing Strategy**

**Cr Hr: 3                      Prerequisite: MBA 512 and MBA 515                      Grad Scheme: Letter**

This upper-level marketing course is one of the capstones for MBA Digital Marketing students. It builds on the “first principles” of marketing strategy approach which unites concepts discussed in previous marketing courses and concentrates on the development and application of value-enhancing strategies. More precisely, it argues that marketing strategies should be designed considering four principles: All customers are different, all customers change, competitors will react to a firm’s strategic changes, and every firm must allocate their budget to implement efficient and effective strategies. Students will learn the components and construction of a strategic marketing plan and gain considerable experience in making complex marketing decisions.

### **MBA 530                      Managing Strategic Business Projects**

**Cr Hr: 3                      Prerequisite: MBA 511                      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 531                      Marketing Research Project**

**Cr Hr: 3                      Prerequisite: MBA 527                      Grad Scheme: Letter**

Students in this course will conduct a marketing research project individually or in small groups. The project will aim to answer a marketing-related research question using qualitative or quantitative empirical methods. Further, they learn how to document, present, and discuss their findings. By providing an independent contribution to a complex research project, students will link theory and practice while also acquiring additional social skills through group work. The project includes reviewing literature, devising causal relationship hypotheses, collecting data, and testing hypotheses. Through this practical course, students will gain experience in using empirical methods, particularly data collection and evaluation (e.g., using multivariate analysis methods). The students will have discussions in milestone meetings with the supervisor and a final presentation of their results and implications.

### **MBA 532                      Supply Chain Management**

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

At the end of this course, students will not only be able to address the activities involved in managing the chain of supplies, but also to obtain the necessary skills to assess and evaluate supply chain performance and make recommendations to increase supply chain

competitiveness. The course will provide students with the knowledge and tools necessary to develop, implement, and sustain strategies for the purpose of managing supply chain issues. Topics include building a strategic framework to analyse supply chains, designing supply chain networks, planning demand and supply, managing inventories, sourcing, transporting, pricing, and revenue management.

### **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 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: MBA 515      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 & approved by the MBA Office. 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, & Marketing.

### **MBA 536      Digital & Social Media Marketing**

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

This core course aims to build a thorough understanding of the digital and social media marketing instruments that serve to achieve an organization's marketing objectives by providing a coherent customer experience along the customer decision journey. The course covers the contemporary methods and approaches of marketing to connected customers with outbound and inbound digital and social media marketing instruments. State of the art methods for measuring the performance and return on investment of these instruments are also discussed.

### **MBA 537      Global Marketing**

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

The course provides a comprehensive understanding of the issues and challenges inherent in the formulation and implementation of global marketing programs. Such programs must account for international differences among the needs and preferences of customers with varying levels of purchasing power as well as disparate cultures, languages, and climates. Therefore, key emphasis is placed on the various forces affecting international marketing decisions, such as whether a company should internationalize and, if so, which markets it should enter and how. These topics are discussed through the lens of an increasingly global consumer culture.

### **MBA 538      Entrepreneurship and Innovation**

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

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

**MBA 540 Islamic Finance****Cr Hrs: 3 Prerequisite: MBA 516 Grad Scheme: Letter**

This course introduces and explains the basic pillars of Shari'ah Law as applied to finance and explores its various dimensions and interpretations, highlighting best practice. The course emphasizes the functions of the Islamic Financial System, including products and services such as Murabaha, Mudarabah, Musharakah, Bai Salam, Istisna, Ijarah, Sukuk and other instruments.

**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. Students will also be able to develop action plans for managerial applications of effective strategic HR planning, recruitment and selection in the workplace, appropriate for maximizing stakeholder value.

**MBA 542 Contemporary Economic & Financial Issues****Cr Hr: 3 Prerequisite: MBA 513 Grad Scheme: Letter**

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

**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. Students will demonstrate and explore the marketing mix over the Internet, online consumer behaviour, online marketing research, website developments, legal and ethical issues, and social media marketing.

**MBA 544 Financial Statement Analysis & Security Valuation****Cr Hr: 3 Prerequisite: MBA 516 Grad Scheme: Letter**

At the end of this course, students will be able to comprehensively understand financial statement analysis. Student will learn how 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. Students will apply methods of fundamental analysis and equity valuation in a series of assignments and projects using financial data of publicly traded Saudi and non-Saudi companies.

**MBA 545 Independent Study****Cr Hr: 3 Prereq: MBA 511, MBA 514 and MBA 516 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. 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 evaluate the contextually appropriate application of management approaches in a variety of international settings. Students will also be able to design and apply a comparative benchmarking process to differentiate and reconstruct relevant management responses for local applications.

### **MBA 547                      Contemporary International Management Issues**

**Cr Hr: 3                      Prerequisite: MBA 514                      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. Students will also analyse and evaluate the opportunities and threats posed by these topics and respond with locally relevant recommendations and strategies.

### **MBA 549                      Corporate Finance**

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

This course analyses theoretical issues and practical applications in corporate finance. Topics include capital structure, liquidations preferences as suggested by agency models, pecking order theory, timing models, dividend policy, two fund separation theorem, convertible securities, initial public offerings, mergers and acquisition, and capital budgeting.

### **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 549                      Grad Scheme: Letter**

This course is designed to expand students' understanding of derivative-related financial instruments & their use in investment & corporate finance situations. The course focuses on the practical applications of these instruments for speculation & tactical asset allocation strategies. Valuation models are explored and used within an arbitrage framework. The course develops basic mathematical tools necessary for analysis and pricing and covers forwards, futures, options, swap contracts, hedging, and derivatives-pricing models.

### **MBA 553                      Bank Management**

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

This course is designed to provide techniques for the financial management of commercial banks. Topics include risk management strategies based on industry structure, interest-rate risk, duration, lending practices, and international banking rules and regulations. It also covers capital management and financial gap analysis. The purpose and functions of central banking are also studied with attention to monetary targets and policies.

### **MBA 555                      Corporate Governance, Business Ethics, & Corporate Social Responsibility**

**Cr Hr: 3                      Prereq: MBA 514, MBA 516                      Grad Scheme: Letter**

The course aims to develop an understanding of the underlying concepts of corporate governance, business ethics and CSR which are relevant to the contemporary business environment. It is designed to foster students' understanding of the ethical influences on economic, financial, managerial, and environmental aspects of business. The course further aims to develop students' ability to critically analyse ethical issues in business. This course reviews different regulatory processes essential to the understanding of the principles of corporate governance in Saudi Arabia, the region and Europe.

### **MBA 558            Value Innovation Strategy**

**Cr Hr: 3            Prerequisite: MBA 512            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. Students will also be able to explain key concepts, frameworks and tools of value innovation strategy. The application of fundamental methodology for creating and capturing new market space is of paramount importance, as is the logic and methods commonly used for strategic business moves.

### **MBA 560            Healthcare Management**

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

At the end of this course, students will be able to explain the foundations of healthcare management - as a discipline and as a management process. Students 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 561            Investment & Portfolio Theory**

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

This course provides a comprehensive coverage of portfolio management and covers both theoretical and practical asset pricing models and management techniques for the purpose of evaluating the results of financial portfolios. It also explores topics related to market efficiency and evaluation of portfolio managers.

### **MBA 562            Health Informatics**

**Cr Hr: 3            Prerequisite: MBA 560            Grad Scheme: Letter**

Health Informatics provides an overview of health information management systems (HIMS), including the data within these systems and the translation of the data into interpretable information and subsequent knowledge. Students are introduced to information systems infrastructure and how information is incorporated into the operational process, clinical environments and medical research. At the end of the course, students will be able to analyse data, data flow and other pertinent information related to healthcare organizations.

### **MBA 563            Management Control & Performance Measurement**

**Cr Hr: 3            Prerequisite: MBA 560            Grad Scheme: Letter**

The objective of this course is to show how to design, implement and use management control and performance tools, techniques, and systems to achieve business objectives both tactically and strategically. This includes analysing the impact of control and performance management on organizational governance how management can measure and evaluate performance of the firm at various levels and what types of management incentives and rewards can be used to achieve proper performance and decision making.

### **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 567                      Practicum & Seminar**

**Cr Hr: 3                      Prerequisite: MBA 560                      Grad Scheme: Letter**

The aim of this course is to develop student skills and to demonstrate the application of classroom knowledge and theory through a practice experience relevant to their areas of interest. The students will have the opportunity to provide evidence of application to potential employers. The practicum will be supervised and evaluated by a qualified preceptor/academic advisor and must be framed and carried out within a public health practice context with an established organization or agency and apply public health skills and competencies.

### **MBA 568                      Financial Econometrics**

**Cr Hr: 3                      Prerequisite: MBA 511 and MBA 516                      Grad Scheme: Letter**

This course introduces basic principles and tools of econometrics using finance theories and relevant empirical applications. Students conduct applied financial research using appropriate statistical software such as SPSS and E-Views while covering essential theoretical concepts and statistical tools. The course will cover the fundamentals of probability, statistics, and regression analysis, as well as ARCH and GARCH models and other techniques appropriate for financial modelling.

### **MBA 570                      Risk Management**

**Cr Hrs: 3                      Prerequisite: MBA 516                      Grad Scheme: Letter**

This course is designed to be an introduction to the concepts, theories and practical applications associated with the measurement and management of financial, interest rate, and exchange rate risks. The course introduces students to forward, future and option markets as a means of reducing financial risk.

### **MBA 571                      Integrated Marketing Communications**

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

This course offers an in-depth exploration of all promotional activities that help businesses produce an integrated, market-focused brand message, including direct marketing, advertising, sales promotion, personal selling, public relations, social media, and publicity. While marketing is calculated and planned, this course will also highlight the role of creativity and how brands can appeal to consumers through memorable messaging.

### **MBA 572                      Sales & Value-Added Tax**

**Cr Hr: 3                      Prerequisite: MBA 523                      Grad Scheme: Letter**

This course explores a variety of topics in indirect taxation, including value-added taxes, sales and use and goods and services taxes and other indirect taxation methods frequently used by authorities. Import and export taxes are also covered.

### **MBA 573                      Applied Econometrics**

**Cr Hr: 3                      Prerequisite: MBA 515                      Grad Scheme: Letter**

At the end of this course, students will be able to analyse economic data using real-world examples and applying statistical and mathematical methods for 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 help 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 and fiscal policies using real-life macroeconomic data. Analytical tools will be applied to analyse global economic data for informed 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. Students will also evaluate conflict, ethics, and dispute resolution from the perspectives of a negotiator and as a third party.

### **MBA 580                      Consumer Behaviour and Insights**

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

This course examines behavioural theories and research findings, emphasising consumer evaluation of purchasing alternatives and decision making, and the marketing organization's role in influencing those decisions. Students will analyse, review and evaluate advanced readings from the consumer behaviour literature, develop an empirical study examining a specific topic in consumer research, and present it to their fellow students.

### **MBA 581                      Managerial Decision Making**

**Cr Hr: 3                      Prerequisite and/or Corequisite: MBA 515                      Grad Scheme: Letter**

This course is designed to help students make better managerial decisions. It helps students recognize decision-oriented problems; how to represent and model the core structure, and how to analyse the problem using both 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.

### **MBA582                      Total Quality Management**

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

The many factors that affect the quality of products and services comprise the broad subject called total quality management (TQM). The goal of this course is to familiarize students with all aspects of TQM and to provide them with the knowledge they need to become designers of, and participants in, TQM programs. The topics covered in this course include strategic quality planning, organization structure for quality, quality in design and processes, statistical tools for quality assurance and process management.

## **MBA 584                      Organizational Theory**

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

This course examines different perspectives on organization theory and their relevance for management of organizations, both for-profit and non-profit. We will discuss how organization theory conceptualizes organizational environment, social structure, technology, culture, power, and conflict and how these subjects are reflected in real-life situations encountered in organizational practices. While examining various organizational theories, we will also be reading and discussing numerous cases so that difficult to understand, abstract concepts and theories become easier to grasp and apply in practice.

## **MBA 585                      Leadership in Organizations: Principles & Practice**

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

This course examines the theory and practice of leadership in different settings, from small groups to large, multinational corporations. We will study different types of leadership, such as authentic leadership, servant leadership, transformational leadership and adaptive leadership, and their relevance and adjustments in different cultures, business climates and practical situations. Based on lectures and business cases, students will learn to act as good leaders, engage in effective problem solving and prepare for their leadership roles and managerial responsibilities for the purpose of exercising a positive, beneficial impact on organizations, communities, and society.

## **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, economic principles, market area analysis, investment and financing issues, and brokerage and management. Special emphasis will be given to the methods of creating economic and social value and the dynamics of emerging markets and trends.

## **MBA 591                      Insurance**

**Cr Hrs: 3                      Prerequisite: MBA 515                      Grad Scheme: Letter**

This course will present risk exposures with respect to individuals and firms. A wide variety of risk reduction techniques will be studied including life, property and casualty insurance. Students will explore topics related to liability insurance, health insurance, employee benefits, social insurance, legal principles, and functional and financial operations of insurers. In addition, the course will examine the problems faced by insurers, such as reinsurance and investment policies.

## 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 506            Human Gross Anatomy**

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

This course is a study of human anatomy and imaging for MSc Clinical Anatomy. The course consists of dissection and tutorials in gross anatomy. Students should expect to spend at least 6 hours/wk in the lab and 2-4 hr/wk in tutorials. By the end of this course the student will be able to:

- Describe the normal gross anatomy of all the major body regions and systems according to their identification on cadavers, functional explanations and clinical relevance.
- Apply their anatomical knowledge to develop a diagnostic reasoning approach to basic clinical and pathological scenarios.
- Create a virtual patient case study by integrating cadaveric findings with independent research.
- Develop stronger problem-solving, communication and collaboration skills through classroom discussions, group work and verbal assessments.

### **MBS 507      Clinical Embryology**

**Cr Hr: 2**

**Pre-requisite:**

**Grad Scheme: Letter**

This course is a study of human clinical embryology for MSc Clinical Anatomy. The course consists of Lectures and tutorials in embryology.

Course Objectives:

- Describe the embryology of all the major body regions and systems and relate it to common type of congenital abnormalities.
- Apply their anatomical knowledge to develop a diagnostic reasoning approach to basic clinical and pathological scenarios.
- Develop stronger problem-solving, communication and collaboration skills through classroom discussions, group work and verbal assessments.

### **MBS 508      Human Neuroanatomy**

**Cr Hr: 2**

**Pre-requisite:**

**Grad Scheme: Letter**

The purpose of this course is to provide a general introduction to the structure and function of the human nervous system. Lectures will provide an overview of the anatomy, interconnections, and function(s) of specific regions/structures of the human nervous system. The laboratories offer a hands-on opportunity to identify the major landmarks of the brain and better understand the three-dimensional architecture of the brain, spinal cord and Head Neck region. Collectively, the lectures and laboratories will provide the anatomical and functional foundation necessary to understand disorders of the nervous system. A variety of disorders affecting the nervous system, such as stroke, schizophrenia, cancer, Parkinson's disease, and Huntington's disease, will be discussed in terms of clinical signs/prognosis and cause/pathology. In addition, clinical issues will be examined using case studies. Each student will be assigned a case study to independently investigate and present to the class using basic and clinical primary research sources.

### **MBS 509      Histology and Cell biology**

**Cr Hr: 3**

**Pre-requisite:**

**Grad Scheme: Letter**

This course is a detailed study of the microscopic structure of cells, tissues and organs, with emphasis on man and on animals used in biomedical research. In this course relationship of structure to function are stressed. This course is a survey course of mammalian histology with emphasis on clinical applications relevant to healthcare professionals. The course expects and highly encourages student participation and uses tutorial-style microscopic exploration of histologically sectioned material and demonstrations.

### **MBS 510      Clinical rotation in Surgery, Radiology and Pathology**

**Cr Hr: 2**

**Pre-requisite:**

**Grad Scheme: Letter**

The purpose of this course is to exposed students to clinical practice and understands the utility of anatomy in clinical fields. The students will spend two weeks observership in each of these clinical disciplines.

### **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 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 554                    Transfusion Medicine and Blood Banking**

**Cr Hr: 2 Theory+1 Practical; Prerequisite: None**

This course is a comprehensive investigation into the theoretical and practical basis involving the selection and processing of donated blood. It offers a thorough understanding of the physiological, pathological and practical aspects of blood storage and transport. The course covers the principles and practical aspects of blood collection, testing, and blood component preparation and storage. It also gives an in-depth knowledge of the blood group antigens and transfusion therapy. It covers the principle of laboratory techniques used in transfusion medicine laboratories. It includes practical experience in problem-solving of patient /donor typing problems and identifying antibodies to blood group antigens.

## **MBS 555                    Molecular Diagnostics in Blood Transfusion**

**Cr Hr: 2 Theory+1 Practical; Prerequisite: None**

This course combines emerging modern laboratory diagnostic techniques and their application to blood groups typing and detection of blood pathogens. Topics include discussion of principles of Sanger sequencing, next generation sequencing, Nanopore sequencing technology and other third generation sequencing technologies. The course will discuss principles of nucleic acid testing (NAT) molecular technique for screening blood donations for pathogens such as HIV, HCV and HBV.

## **MBS 556                    Stem Cell Transplantation Technology**

**Cr Hr: 2 Theory +1 Practical; Prerequisite: None**

An in-depth look is provided at the immune system and its relation to stem cell and cord blood transplantation. A formal study is offered of the aspects of histocompatibility, in relation to stem cell transplantation and platelet transfusion. Histocompatibility antigens and nomenclature is discussed. The course will also cover the selection of matching donors/cord blood unit for hematopoietic stem cell transplantation (HSCT), related and unrelated donors, haploidentical donors, techniques used for HLA typing, anti-HLA antibody, and chimerism.

## **MBS 557                    Pathogenesis of Blood Disorders**

**Cr Hr: 2 Theory + 1 Practical; Prerequisite: None**

This course offers an advanced study in the pathological mechanisms underlying red blood disorders, including anemias, hemolytic disease of the fetus and newborn, autoimmune

hemolytic anemias, drug-dependent hemolytic anemias and other blood disorders requiring regular blood transfusion and component therapy.

### **MBS 558                      Quality Management and Laboratory Accreditation**

**Cr Hr: 2 Theory +1 Practical; Prerequisite: None**

Blood banking and transfusion medicine encompass many areas from donor recruitment and selection, blood collection laboratory practices and use of blood components and products. Hemovigilance is closely linked to all these and strict regulations and quality management is needed. This course will cover definitions of quality systems, emphasizing the importance of total quality management and quality elements. The graduates are intended to demonstrate proficiency in maintaining the quality of blood components and transfusion services as per international and local standards. Overview of proper use of instrumentation and computerization in transfusion services will be included.

### **MBS 560                      Method Comparison & Validation**

**Cr Hr: 2 Theory +1 Practical; Prerequisite: None**

The aim of this course is to familiarize students to the methods to verify the quality of diagnostics kits in a clinical laboratory. Validation procedures, measuring total allowable error and steps to introduce new tests will be presented. Topics covered will include compliance with proficiency testing requirements (CAP, AABB, CBAHI and ISO), determination and validation of tests reference ranges, cut-off points and quantitative and qualitative methods evaluation.

### **MBS 600                      Thesis**

**Cr Hr: 18                      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 lecture 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 with examples of applications in biomedical sciences, radiological & imaging sciences, and epidemiology & public health.

### **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 Cardiac Nursing

### **MCN 511            Cardiovascular Pulmonary 1**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

This course introduces the registered nurse to the cardiovascular and pulmonary systems. The course unpacks the normal structures and functions of the human body. It then focusses upon the anatomy, physiology, hemodynamics, microbiology, biochemical processes, immunology, and pathology of the cardiovascular and pulmonary systems. At the completion of the course, the student should be able to discern between normal and abnormal cardiopulmonary anatomy and physiology, and microbiological, biochemical and immunological laboratory data.

### **MCN 512            Cardiology Diseases**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

This course introduces the registered nurse to both congenital and acquired cardiac anomalies and the metabolic heart diseases prevalent to the Saudi Arabian neonatal, pediatric, adolescent, and adult population. The course unpacks the pathophysiology, treatments, and complications of these disorders. Topics explored include, metabolic heart disease, acyanotic lesions with increased pulmonary blood flow, acyanotic lesions with left ventricular and aortic outflow tract obstruction, cyanotic lesions with decreased pulmonary blood flow and cyanotic lesions with mixed venous and systemic blood flow. At the completion of the course, the students will be able to describe the aberrant hemodynamics and or clinical pathways of these disorders as well as the recommended surgical and or interventional treatments across all age groups.

### **MCN 514            Quality and Safety Consideration in Nursing Care**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

This course introduces the registered nurse to the notions of quality and safety in the context of care delivery in hospitals. The registered nurse will be introduced to the competencies set forth by the Quality and Safety Education for Nurses (QSEN) organization. Systematically, the course educates the nurse to incorporate quality and safety competencies when planning, implementing, assessing and evaluating nursing care. At the completion of the course, the students will be able to articulate a rational behind their integration of quality and safety competencies into planned nursing care.

### **MCN 521            Cardiovascular Pulmonary 2**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

This course builds upon and reviews the content taught in AAA 111 Cardiovascular-Pulmonary Systems – 1. In the context of these two systems, the course unpacks the importance of understanding the growth and developmental milestones from the neonatal period through to that of the geriatric period. Understanding the influence of milestone development on the interpretation of physical assessment findings and subsequent nursing care decision making is fundamental in the provision of effective care delivery. The participants of the course will reflect on nursing considerations in the context of a nursing care model, patient and family centered care, professional nursing standards, and quality and safety considerations. At the completion of the course, the student should be able to undertake a full physical assessment, reflecting upon laboratory results and radiological findings to determine priorities of care in context of the patient's age.

## **MCN 522                      Clinical Cardiology (Pediatrics, Adults) & Intensive care**

**Cr Hr: 3    Prerequisite: None                      Grad Scheme: Letter**

This course introduces the registered nurse to the specialty of clinical cardiology for patients across the age spectrum and their care in the intensive care setting. The course demonstrates how the disruption to one of the five major systems can lead to more widespread dysfunction in other systems whilst describing in detail the pathophysiology of ischemic heart disease and the various risk factors that are attributed to its development. The students will develop the knowledge, skills and attributes required in assessing and managing patients with ischemia, angina and myocardial infarction. Further, the course unpacks the more critical nursing considerations required when caring for an individual managed in the intensive care unit (ICU). Further, students will be introduced to specific knowledge, skills and attributes requisite to ICU setting. At the completion of the course, the students will be able to predict appropriate ICU management considerations when presented with typical ICU case scenarios. Further, they will be able to identify possible risks and the nursing management actions that would mitigate these risks. Finally, the students will be able to explain the development, assessment and management of ischemic heart disease be able to assess rhythm strips and 12 Lead ECGs for aberrant arrhythmias as well ischemia, injury and infarction changes.

## **MCN 523                      Evidence-based Practice**

**Cr Hr: 3    Prerequisite: None                      Grad Scheme: Letter**

This course introduces the registered nurses to the foundational knowledge, skills and attributes pertaining to evidence-based practice in healthcare. The course historically contextualizes the registered nurses understanding to the importance of research and evidence-based practice. Topics included in the course are: construction of clinical questions; types and levels of evidence; strengths and weaknesses of evidence; literature search strategies and databases; critical appraisal tools. At the completion of the course, the student will have the knowledge and skills to build and subsequently submit a clinical project proposal.

## **MCN-C 531                      Clinical Pediatric Cardiology**

**Cr Hr: 3    Prerequisite: None                      Grad Scheme: Letter**

This course positions the student in pediatric cardiology wards. The students will be planning, implementing assessing and evaluating nursing care of the pediatric cardiology patient.

## **MCN-C 532                      Clinical Adult Cardiology**

**Cr Hr: 3    Prerequisite: None                      Grad Scheme: Letter**

This course positions the student in adult cardiology wards. The students will be planning, implementing assessing and evaluating nursing care of the adult cardiology patient.

## **MCN-C 533                      Clinical Cardiac Surgery**

**Cr Hr: 3    Prerequisite: None                      Grad Scheme: Letter**

This course positions the student in cardiac surgical wards. The students will be planning, implementing assessing and evaluating nursing care of adult and pediatric cardiac surgical patients.

## **MCN-C 534                      Clinical Cardiac Intensive Care**

**Cr Hr: 3    Prerequisite: None                      Grad Scheme: Letter**

This course positions the student in cardiac intensive care units. The students will be planning, implementing assessing and evaluating nursing care of adult and pediatric cardiac intensive care patients.

## **MCN 601            Capstone Project**

**Cr Hr: 6    Prerequisite: None            Grad Scheme: Letter**

The intent of this project is to enable 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.

## **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.

## 4.4 Master of Clinical Psychology

### **MCP 500            Neuropsychology**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

The purpose of this course is to equip clinical psychology practitioners with the knowledge of how biological factors affect behavior. At the conclusion of the course, students will be able to explain how neurons communicate between them and the function of synapses. Higher order brain functions are going to be covered such as future planning, the frontal lobe and behavioral inhibition (e.g. criminal offending in adolescence), emotion centers in the brain as well as reward pathways (e.g. drug addiction). The course will close on sleep cycles and stages of sleep along with variables that may be influencing disturbances in the circadian rhythm.

### **MCP 501            Clinical Psychology**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

At the end of this course, students will acquire knowledge on the development of clinical psychology from an Islamic perspective and its shift to western sciences. Furthermore, they will be able to understand what mental illness and its definition is. The reason behind each mental illness will be discussed and analyzed, considering biological and psychologically theories. Identify symptoms and what are the guidelines for pharmacological treatment and different method of psychotherapy that is been used. Finally, the prognosis of each illness and an understanding of the mental illness classification, in particular to DSM-5 classification system.

### **MCP 502            Schools of Psychotherapies**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

This course has been developed to equip the students with the major evidence-base psychotherapies. Student will learn about the four waves of psychotherapy in addition to their critical forms of analysis. Students will need to develop an understanding in relation to the values of these schools, beliefs, assumptions about human nature, and the common worldview trend.

### **MCP 503            Case Formulation**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

In this course, students will be taught the leading psychological theories in explaining human behaviors and sickness. They will be taught how to formulate a case based on certain theories and how to diagnose based on the Diagnostic and Statistical Manual of Mental Disorder (5th Ed). Consequently, they will be also taught the evident base of psychological therapy. In other words, how to explain the client's symptoms, personality characteristics, cognitions, feelings, and behaviors in light of a particular theory or integration of theories.

### **MCP 504            Assessment and Clinical Interview**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

Equip clinical psychologists with the knowledge of appropriate methods for psychological assessment and their application as well as appropriateness to different groups and ages. In addition to the ethical course running in parallel, understand the legal and ethical issues surrounding test administration and interpretation. This course includes some historical background of the developments of psychological assessment in clinical psychology practice as well as the theoretical foundations of the assessment tools. By the end of this course, the psychologist should be able to choose the appropriate assessment tool to be



applied for a certain age range and according to the specific symptoms described. Furthermore, the psychologist should be able to score and interpret the results as well as write a detailed report about the client.

### **MCP 505            Cognitive Behavioural Therapy**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

This course has been developed to equip the students with the major evident-base psychotherapies with an emphasis on Cognitive Behavioral Therapy. Student will learn about the four waves of psychotherapy with its critical analysis as well as self-reflection in relation to values, beliefs, assumptions about human nature, and worldview.

### **MCP-C 506            Neurorehabilitation Unit**

**Cr Hr: 6    Prerequisite: None            Grad Scheme: Letter**

After being taught about the biology of the brain students will visit the neurorehabilitation unit. Students will interact with patients that experience both psychological and physical changes as a result of brain injury. During this three-month phase students will learn the cognitive therapies applied to evaluate as well as restore motor and cognitive function in patients that have suffered a head injury, or stroke.

### **MCP-C 507            Child & Adolescent Psychology Unit**

**Cr Hr: 6    Prerequisite: None            Grad Scheme: Letter**

Interaction with children and adolescence is much more challenging than when engaging with an adult. Clinicians will be taught how to approach children and how to evaluate and access the psyche of a child. Moreover, they will engage on a face-to-face interaction with individuals suffering from mental retardation apply diagnostics as well as formulate treatment plans for children with ADHD, mood and stress disorders.

### **MCP-C 508            Neuropsychology Unit**

**Cr Hr: 6    Prerequisite: None            Grad Scheme: Letter**

After passing the Neuropsychology course, students will visit the Neurology and Neurosurgery unit. Students will interact with patients that experience different kinds of neurological problems, such as epilepsy, Parkinson's and stroke. They will learn to apply the skills that they have learned in class in a clinical setting.

### **MCP-C 509            Adult Psychology Unit**

**Cr Hr: 6    Prerequisite: None            Grad Scheme: Letter**

During this phase of the internship students will go through the process of interviewing patients and conceptualizing a clinical case of mental complaints that relate to different forms of psychological problems such as depression, anxiety, panic attacks, etc., offering psychological intervention based on evident-based approach.

### **MCP 601            Research/Capstone Project**

**Cr Hr: 6            Grad Scheme: Letter**

This intent of this project is to enable 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 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 Clinical Speech- Language Pathology

### **MSP 500 Clinical Methods and Ethical Considerations**

**Cr Hr. 3**

**Prerequisite: None**

**Grad Scheme: Letter**

Exploration of the fundamentals of clinical methods, including evaluation process, goal setting, behavior management, pacing of therapy, shaping of behavior, tracking performance/learning, and professional and ethical behavior through observation of clinical interactions. Discussion of data collection and documentation methods. Introduction to the assessment process. Exploring counseling; development of appropriate intervention plans that meet patient needs in collaboration with patient and relevant others; communicating effectively and recognizing needs, values, preferred mode of communication, and cultural linguistic background of patient, family, caregivers, relevant others; providing counseling to patients, family, and caregivers regarding communication and swallowing disorders.

### **MSP 501 Feeding and Swallowing Disorders**

**Cr Hr. 3**

**Prerequisite: None**

**Grad Scheme: Letter**

This course will include a review of the structural and functional aspects of the aero digestive tract and motor control for swallowing. It will also include a review of the development of anatomy and physiology of feeding and swallowing in infants and children. Exploration of the physiological and anatomical disturbances affecting swallow function. Focus will be on assessment (instrumental and bedside) and treatment of both adult and pediatric with swallowing disorders.

### **MSP 502 Fluency & Speech Sounds Disorders**

**Cr Hr. 3**

**Prerequisite: None**

**Grad Scheme: Letter**

The course will include an overview of the typical speech/sound acquisition, and theoretical approaches to phonological analysis. These will include characteristics of speech sound disorders in children focusing on the assessment, diagnosis, and treatment of articulation and phonological disorders as well as childhood apraxia of speech. Emphasis will be placed on integrating normative data, scientific knowledge and clinical practice of the Arabic Speech Sounds.

### **MSP 503 Neurogenic Acquired Communication Disorders**

**Cr Hr. 3**

**Prerequisite: None**

**Grad Scheme: Letter**

Overview of communication disorders secondary to brain damage in adults; The course will include the assessment, diagnosis and treatment of social aspects of communication as well as the management of acquired cognitive-communication disorders associated with traumatic brain injury, right hemisphere damage, and neurodegenerative diseases. The assessment, diagnosis, prognosis, treatment and recovery processes associated with aphasia, dysarthria and apraxia will also be covered. Emphasis on the integration of normative data, scientific knowledge, and clinical practice.

### **MSP 504 Alternative and Augmentative Communication**

**Cr Hr. 3**

**Prerequisite: None**

**Grad Scheme: Letter**

Examination of the potential etiologies requiring assistive communication methodologies. The course will include discussion of the approaches in the development of alternative modes of communication for individuals with severe communication impairments.

## **MSP 505                      Developmental Language Disorders**

**Cr Hr. 3**

**Prerequisite: None**

**Grad Scheme: Letter**

Advanced topics in the natural receptive and expressive language development as well as the social and behavioral aspects of communication. This course will cover the potential etiologies and characteristics of language disorders in children with specific language impairment, autism spectrum disorders, and cognitive based language impairments as well as the interaction between language, learning, and literacy. The focus of the course will be in the assessment, diagnosis and effective treatment of language disorders in pediatrics.

## **MSP 509                      Principles of Voice Production and Disorders**

**Cr Hr. 3**

**Prerequisite: None**

**Grad Scheme: Letter**

Basic physical, physiological principles in understanding typical voice production, professional, nonprofessional, impaired voice production; vocal anatomy, voice classification; control of loudness, pitch, register, quality; efficient, inefficient use of voice; instrumentation for voice analysis, synthesis. In addition to application of methods of intervention in development, training, rehabilitation of vocal behavior; motor learning, efficacy of treatment strategies, factors affecting compliance with recommended therapy.

## **MSP 514-                      Practicum I: Pediatric Populations**

**Cr Hr. 2**

**Prerequisite: None**

**Grad Scheme: Letter**

Clinical experience in the evaluation and treatment of pediatric clients. Including assignment to clinical teams, clinical team meetings addressing clinical methods with pediatric patients.

## **MSP 515 -                      Practicum II: Adult Populations**

**Cr Hr. 2**

**Prerequisite: None**

**Grad Scheme: Letter**

Clinical experience in the evaluation and treatment of adult clients. Including assignment to clinical teams, clinical team meetings addressing clinical methods with adult patients.

## **MSP 516 -                      Practicum III: Specialized Populations**

**Cr Hr. 2**

**Prerequisite: None**

**Grad Scheme: Letter**

Clinical experience in the evaluation and treatment of specialized clients. Including assignment to clinical teams, clinical team meetings addressing clinical methods with pediatric patients.

## **MSP 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 defense. 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.

## **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 lecture 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 such as 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.

## **4.6 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 & System 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, and sensitivity analysis, and 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 course 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 524      Artificial Intelligence**

**Cr Hr: 3    Prerequisite: None      Grad Scheme: Letter**

MEM 525      Machine Learning

**Cr Hr: 3    Prerequisite: None      Grad Scheme: Letter**

## **MEM 526      Advanced Big data**

**Cr Hr: 3    Prerequisite: None      Grad Scheme: Letter**

## **MEM 527      Industrial Internet of Things (IIoT)**

**Cr Hr: 3    Prerequisite: None      Grad Scheme: Letter**

## **MEM 600      Thesis**

**Cr Hr: 18      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/departments. 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 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 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.

## 4.7 Master of Genetic Counselling

### **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 Lab Practicum**

**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 518                    Introduction to Medical & Population Genetics I**

**Cr Hr: 2    Prerequisite: None                    Grad Scheme: Letter**

This course is designed to introduce fundamental principles of medical genetics with emphasis on the genes and molecular mechanisms operating in human diseases. The general principles of disease inheritance, pathogenesis, diagnosis, management and counselling will be reinforced through case studies. Principles of Population Genetics will be taught including the Hardy-Weinberg Law, mutation selection & genetic drift, Association, linkage disequilibrium, and pedigree & Bayesian analysis.

### **MGC 519                    Introduction to Medical & Population Genetics II**

**Cr Hr: 2    Prerequisite: MGC 518                    Grad Scheme: Letter**

This course is designed to introduce fundamental principles of medical genetics with emphasis on the genes and molecular mechanisms operating in human diseases. The general principles of disease inheritance, pathogenesis, diagnosis, management and counseling will be reinforced through case studies. Principles of Population Genetics will be taught including the Hardy-Weinberg Law, mutation selection & genetic drift, Association, linkage disequilibrium, and pedigree & Bayesian analysis.

### **MGC 601                    Research/Capstone Project**

**Cr Hr: 6    Prerequisite: None                    Grad Scheme: Letter**

This intent of this project is to enable 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 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.

## 4.8 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, flywheel, 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, MNT530                    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 551                    Cancer mechanisms as therapy targets**

**Cr Hr: 3                    Co-req. MNT530                    Grad Scheme: Letter**

The course provides a comprehensive overview of the core aspects of cancer biology. The emphasis will be placed on the molecular mechanisms of cancer pathophysiology at the nanoscale resolution- such as molecular complexes that regulate DNA damage and repair; cell division, death and senescence as well as on system biology, microevolution of tumors, and interaction between tumor and the host. The course will include in-depth analysis of the signal transduction mechanisms in cancer; and whether those mechanisms are druggable targets.

## **MNT 552                    Advanced Topic in Cancer Biology and Theranostics**

**Cr Hr: 3                    Prereq. MNT 551, MNT510; Co-req. MNT520                    Grad Scheme: Letter**

The course is primarily based on most recent publications in the field of cancer research from top journals (Nature Reviews Cancer, Cancer Cell, Cancer Discovery etc.). A flexible course structure is designed to keep up with the accelerating rate of discovery in the area of translational cancer research and with the current shift to knowledge-guided targeted therapies based on precision medicine and theranostic concepts. The course will focus on high quality publications that provide in-depth analysis of deregulated signaling mechanisms manifested as potential drivers for cancer and discuss novel strategies for cancer prevention, diagnosis and treatment. Special emphasis will be made on innovative diagnostic and treatment approaches that utilize effective nanotherapeutic and nanodiagnostic modalities.

## **MNT 553                    Cancer Genomics and Bioinformatics**

**Cr Hr: 3                    Grad Scheme: Letter**

The course is aimed at meeting the contemporary high demands of cancer researchers for efficient utilization of the rapidly accumulated and publicly available “omics” data. Cancer research has rapidly embraced high throughput technologies (HT) and Cloud computing. Large amounts of data are being generated from microarray, tissue array, and next

generation sequencing platforms. Dedicated computing clouds such as the Cancer Genome Collaboratory facilitate complex analyses on big cancer data sets from projects hosting their data in the Cloud. Now more than ever, having the informatics skills and knowledge of available bioinformatics resources specific to cancer and how to access and use available data sets is critical.

## **MNT 600                      Thesis**

**Cr Hr: 18                      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.

## **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.

## 4.9 Master of Public Health

### **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: REC 502                      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: REC 502                      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. REC 502, 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. REC 502, 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. REC 502, 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. REC 502, 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. REC 502, 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. REC 502, 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. REC 502, 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  $2 \times 2$  tables,  $m \times 2$  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. REC 502, 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. REC 502, 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. REC 502, 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. REC 502            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**

The practicum is an opportunity for students to apply classroom knowledge and theory to real world public health practice. It is a program accreditation requirement. The aim of the course is to develop student skills and to demonstrate the application of these skills through a practice experience relevant to their areas of interest. The students will have the opportunity to provide evidence of application of these skills to potential employers after completion of the MPH program. The practicum must be supervised and evaluated by a qualified preceptor/academic advisor and must be framed and carried out within a public health practice context with an established organization or agency, and apply public health skills and competencies.

## **MPH 526            Seminar**

**Cr Hr: 1            Grad Scheme: Letter**

As a part of the Alfaisal MPH program and the MBA-Health Management Track curriculum, the MPH 526 Seminar is a practical course, in which the graduate students are trained in presentation skills. At the same time, guest lecturers will be invited to present and discuss with the students state-of-the-art topics in public health and health management.

## **MPH 527                      Communicable & Non-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. Non communicable diseases (NCDs) including cardiovascular diseases, diabetes, cancer and chronic lung disease, are responsible for considerable morbidity and premature adult mortality globally. This course envisions creating public health tools to help physicians implement effective disease prevention and control programs to address their risk factors. The objective is to train students in the interdisciplinary approaches to diseases prevention, treatment and care. The course will also expose participants to key theoretical and empirical knowledge in diseases' research from a range of disciplines, including epidemiology, economics and health systems in the Kingdom of Saudi Arabia, surrounding regions and internationally.

## **MPH 600                      Thesis**

**Cr Hr: 18                      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.

## **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 research or an intervention project. The capstone project utilizes knowledge gained through classroom coursework and is the degree's culminating work. The 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.

## **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 lecture 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 with examples of applications in biomedical sciences, radiological & imaging sciences, and epidemiology & public health.

## 4.10 Master of Radiological & Imaging Sciences

### **MRS 502            Radiological Research**

**Cr Hr: 3    Prerequisite: None            Grad Scheme: Letter**

This course 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 application of a self-study 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    Prerequisite: None            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 525            Musculoskeletal, Neonatal & Pediatric Sonography**

**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 526            Sonographic 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 527                      Echocardiography 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 600                      Thesis****Cr Hr: 18                      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.

**MRS 601                      Research/Capstone Project****Cr Hr: 6                      Prerequisite: None                      Grad Scheme: Letter**

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.

**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 lecture 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 with examples of applications in biomedical sciences, radiological & imaging sciences, and epidemiology & public health.

## 4.11 Master of Sciences in Applied Health Research

### **MAR 501      Advanced Statistics**

**Cr Hr: 3                      Prerequisite: REC 502                      Grad Scheme: Letter**

This course will introduce more advanced statistical methodology. There will be an emphasis on hands-on learning of key statistical methodologies relevant to medical research. Students will use jamovi statistical software and then learn the advanced statistical programming language R using RStudio. The course aims to give students an increased skill set of bio statistical methods that are of relevance to medical research.

### **MAR 502      Clinical Trials**

**Cr Hr: 3                      Prerequisite: REC 502                      Grad Scheme: Letter**

This course will focus on the research design and statistical methodology used in clinical trials. The course aims to give students a working knowledge of clinical trials to allow them to design them and analyse their data.

### **MAR 503      Clinical Data Management**

**Cr Hr: 2                      Prerequisite: REC 502                      Grad Scheme: Letter**

This course will introduce students to issues involved in the management of clinical data. Students will learn the importance of data management in a research setting, involving important issues of data quality and storage.

### **MAR 504      Real Data Analysis**

**Cr Hr: 3                      Prerequisite: REC 502                      Grad Scheme: Letter**

This course to strengthen and build on previous courses, students will analyse real data from actual studies. It may provide an opportunity for students to meet researchers and discuss the statistical aspects of a research study. On completion of this course students will be able to 1) Analyse some real medical research data obtained from an active research group in Riyadh 2) Advise medical researchers on study design and sample size estimates 3) Communicate with the researchers regarding analysis of the data 4) present a report on their experience and their final analysis conclusions.

### **MAR 505      Qualitative Research Methods**

**Cr Hr: 1                      Prerequisite: REC 502                      Grad Scheme: Letter**

This course will introduce students to non-numerical approaches known as qualitative statistical methodology. The students will be familiar with the various qualitative methodologies and know how to apply them depending on the contexts and research goals. On completion of this course students will be able to 1) Describe the scope of qualitative methods 2) Describe different research paradigms 3) Carry out data collection and analysis 4) Describe coding of data 5) Discuss the mixed methods approach 6) Communicate clearly results from qualitative research 7) Describe qualitative research reported in the literature.

### **MAR 506      Systematic Review and Meta-Analysis**

**Cr Hr: 1                      Prerequisite: None                      Grad Scheme: Letter**

This course will introduce students to the methods of reviewing and analysing published data. Students will know how to extract data/statistics from published research to perform meta-analyses and undertake a systematic review.

### **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.

### **MAR 600            Thesis**

**Cr Hr: 18                      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 Alfasal 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.

### **MAR 601            Research/Capstone Project**

**Cr Hr: 6                      Prerequisite: None                      Grad Scheme: Letter**

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.

### **MPH 521            Health Informatics**

**Cr Hr: 3                      Prerequisite: None                      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.

### **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 lecture 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 analysing research data and to better understand the design, conduct, and analysis and subsequently interpret the results of biomedical research studies.

### **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. Students will be informed about the role and importance of the IRB.

## 4.12 Master of Sciences in Health Research Management

### **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 521 Health Informatics**

**Cr Hr: 3**

**Prerequisite: None**

**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.

### **MRM 501 Clinical Research Management Fundamentals**

**Cr Hr: 2**

**Prerequisite: REC 504**

**Grad Scheme: Letter**

The MRM Course is designed to train participants on how to effectively manage clinical research. The course focuses on the spectrum of clinical research and the research process by highlighting epidemiologic methods, study design, protocol preparation, patient monitoring, quality assurance, and regulatory issues encompassing Saudi Food and Drug Administration (SFDA) and National Committee of Bioethics (NCBE). This course will be of significant interest and value to graduate students and other health care professionals planning a post-graduate training after graduation.

### **MRM 502 Law in Healthcare Delivery; Compl, legal, & reg issues**

**Cr Hr: 2**

**Prerequisite: REC 504**

**Grad Scheme: Letter**

This course provides a broad exposure to basic principles and practices of the Saudi Food, Drug, Medical devices, Cosmetics, and Pesticides Act regulating the research and development of pharmaceuticals and biologics for humans and animals. It will include an analysis of legal and social framework affecting academic clinical investigator and the industry with emphasis on MOH and SFDA enforcement actions. Discussions will cover the specific, general, and global issues associated with these laws and regulatory topics. Several field trips and site visits are scheduled during the course to reinforce understanding of the selected topics

### **MRM 503 Fundamentals of Device & Drug Development**

**Cr Hr: 2**

**Prerequisite: REC 502**

**Grad Scheme: Letter**

This course provides a broad exposure to introduction to pharmaceutical industry, process of drug development, and drug development phases (1-4). Regulatory requirements of the Saudi Food and Drug Administration (SFDA) and FDA are reviewed along with the content of the investigational new drug application (IND), new drug application (NDA), marketing authorization application (int'l), and the pharmaceutical regulatory affairs. Course emphasis will be on drug development in addition to development of biologics, OTC, and devices. This course focuses on drug discovery through IND submission and clinical development including portfolio decision-making. The roles and responsibilities of the principal investigator, coordinator, sponsor, and monitor are discussed.

### **MRM 504 Ethical Conduct and Review Board**

**Cr Hr: 2**

**Prerequisite: REC 504**

**Grad Scheme: Letter**

This course is designed to encourage well-informed critical discussions of ethical issues in research management. Scientific considerations in research management policy and interventions occasionally cause political and ethical conflicts. Issues of autonomy, individual rights, coercion, justice, community, and multicultural values are pivotal in ethical research. Population-based perspective of research management goals should be ethically balanced with the preservation of human rights and protection of civil liberties. Goals of this course are: Stimulating the moral imagination, recognizing ethical issues, developing analytical skills, eliciting a sense of moral obligation and responsibility, and coping with moral ambiguity. The course will enable students to recognize, analyse, criticize, and evaluate ethical issues and equip them with practical knowledge to construct arguments and make decisions in research management.

### **MRM 505                      Financial management of Research (2 credit hours)**

**Cr Hr: 2**

**Prerequisite: REC 502**

**Grad Scheme: Letter**

This course provides an in-depth analysis of clinical research financial regulations, budget process, clinical trial revenue cycle, and patient remuneration. This course describes the significance of ensuring that the investigator and study team are integrated into the financial components of the study to mitigate the risks associated with non-compliance with research billing regulations. Students will understand and be able to apply concepts of financial management, decision-making, and quality assessment to health systems and be able to develop broad policy statements concerning research management. Strategies for developing operational efficiencies and establishing communication channels to enhance sponsor reimbursements will also be discussed.

### **MRM 506: Leadership and Quality Management in Research**

**Cr Hr: 2**

**Prerequisite: REC 504**

**Grad Scheme: Letter**

This course provides an in-depth analysis of effective leadership skills encompassing specific human capital, organizational behaviour and project management issues facing research facilities as larger, integrated organizations. Selected topics include high impact communications, negotiating, motivation and recognition. A detailed overview of research leadership and quality management systems, regulations and guidelines has been provided. Development and management of total quality systems meeting regulatory expectations has been highlighted. The covered topics include development, management, usage/maintenance of Standard Operating Procedures (SOPs), deviation/non-conformance systems, corrective/preventative action systems, validation, and process controls via key performance indicators to ensure quality in research.

### **MRM 600                      Thesis**

**Cr Hr: 18**

**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.

### **MRM 601                      Research/Capstone Project**

**Cr Hr: 6**

**Prerequisite: None**

**Grad Scheme: Letter**

The intent of this project is to enable 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.

**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 lecture 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 analysing research data and to better understand the design, conduct, and analysis and subsequently interpret the results of biomedical research studies.

**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. Students will be informed about the role and importance of the IRB.

## 5. Curricula & Study Plans

### 5.1 Master of 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	27	-	27
Subject	-	-	-
Electives	-	15	15
Total	27	15	42

##### Core Courses (27 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 510	Financial Accounting	3	MBA 511
MBA 511	Quantitative Analysis	3	-
MBA 512	Marketing Management	3	-
MBA 513	Managerial Economics	3	-
MBA 514	Organizational Behavior	3	-
MBA 515	Business Analytics	3	MBA 511
MBA 516	Managerial Finance	3	MBA 513
MBA 519	Strategic Management	3	MBA 514, 515, 516, 522
MBA 522	Operations Strategy	3	MBA 511

##### Elective Courses (15 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 518	Human Resource Management	3	MBA 514
MBA 528	Managerial Accounting	3	MBA 510
MBA 530	Managing Strategic Business Projects	3	MBA 511
MBA 532	Supply Chain Management	3	MBA 522
MBA 534	Leading Organizational Change	3	MBA 514
MBA 535	Applied Business Research Project	3	MBA 515
MBA 538	Entrepreneurship and Innovation	3	MBA 512
MBA 541	HR Planning, Recruitment & Selection	3	MBA 518
MBA 542	Contemporary Economics & Financial Issues	3	MBA 513
MBA 543	Internet Marketing Strategy	3	MBA 512
MBA 544	Financial Statement Analysis & Security Valuation	3	MBA 516
MBA 545	Independent Study	3	MBA 515, 514
MBA 550	Service Marketing	3	MBA 512
MBA 551	Derivatives Securities	3	MBA 516
MBA 553	Bank Management	3	MBA 516
MBA 555	Corporate Governance, Business Ethics & CSR	3	MBA 514, 516
MBA 558	Value Innovation Strategy	3	MBA 512
MBA 561	Investment & Portfolio Theory	3	MBA 516
MBA 565	HR Development & Performance	3	MBA 518
MBA 571	Integrated Marketing Communications	3	MBA 512
MBA 573	Applied Econometrics	3	MBA 515
MBA 574	Global Economics	3	MBA 513
MBA 575	Negotiations	3	MBA 514
MBA 580	Consumer Behavior & Insights	3	MBA 512
MBA 581	Managerial Decision Making	3	MBA 515
MBA 582	Total Quality Management	3	MBA 511
MBA 590	Real Estate Analysis	3	MBA 516

##### Suggested Study Plan

Semester 1				Semester 2			
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 516	Managerial Finance	3	MBA 513
MBA 514	Organiz Behavior	3		MBA 512	Marketing Management	3	-
				Elective	(Summer)	3	
	TOTAL	9			TOTAL	12	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr.	Pre-req
MBA 515	Business Analytics	3	MBA 511	MBA 519	Strategic Management	3	MBA 514, 515, 516, 522
MBA 522	Operations Strat	3	MBA 511	Elective		3	
Elective		3		Elective		3	
				Elective	(Summer)	3	
	TOTAL	9			TOTAL	12	



### 5.1.2 Accounting & Taxation Curriculum

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

Type of Courses	Compulsory	Elective	Total
MBA Core	18	-	18
Subject	18	-	18
Electives	-	6	6
<b>Total</b>	<b>36</b>	<b>6</b>	<b>42</b>

#### Core Courses (18 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 511	Quantitative Analysis for Business	3	-
MBA 513	Managerial Economics	3	-
MBA 514	Organizational Behavior	3	-
MBA 515	Business Analytics	3	MBA 511
MBA 516	Managerial Finance	3	MBA 513
MBA 519	Strategic Management	3	MBA 514, 515, 516, 522

#### Subject Courses (18 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 528	Managerial Accounting	3	MBA 511
MBA 517	Communication & Writing for Accountants (NEW)	3	MBA 514
MBA 520	Internal Control, Audit & Fraud Prev & Detection (NEW)	3	MBA 516
MBA 544	Financial Statement Analysis and security Valuation	3	MBA 516
MBA 572	Sales and Value Added Tax	3	MBA 523
MBA 523	Taxation of Business Entities	3	MBA 513

#### Elective Courses (6 Credit Hours; choose two courses)

Course No.	Course Name	Cr.	Prerequisite
MBA 549	Corporate Finance	3	MBA 516
MBA 575	Negotiations	3	MBA 514
MBA 581	Managerial Decision Making	3	MBA 515
MBA 555	Corp Governance, Bus Ethics, & Corp Social Responsibility	3	MBA 516
MBA 545	Independent Study	3	MBA 511, 514, 516
MBA 524	International Taxation	3	MBA 523
MBA 525	Zakat	3	MBA 516
MBA 521	Advanced Topics in Financial Reporting	3	MBA 516

### Suggested Study Plan

Semester 1				Semester 2			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr.	Pre-req
MBA 511	Quantitative Anal	3	-	MBA 516	Managerial Finance	3	MBA 513
MBA 513	Managerial Econ	3	-	MBA 523	Taxation of Bus Ent	3	MBA 513
MBA 514	Organizat Behav	3	-	MBA 528	Management Accounting	3	MBA 511
				Elective	(Summer)	3	-
TOTAL		9		TOTAL		12	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr.	Pre-req
MBA 515	Business Analytics	3	MBA 511	MBA 517	Comm & Writ for Acc	3	MBA 514
MBA 544	Fin Stat Anal & Val	3	MBA 516	MBA 519	Strategic Management	3	MBA 514, 515, 516, 522
MBA 520	Int Cntr Aud Fraud		MBA 516	MBA 572	Sales & Value Add Tax	3	MBA 523
				Elective	(Summer)	3	-
TOTAL		9		TOTAL		12	

### 5.1.3 Digital Marketing

#### Curriculum

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

Type of Courses	Compulsory	Elective	Total
MBA Core	24	-	24
Subject	12	-	12
Electives	-	6	6
<b>Total</b>	<b>36</b>	<b>6</b>	<b>42</b>

##### Core Courses (24 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 510	Financial Accounting	3	MBA 511
MBA 511	Quantitative Analysis for Business	3	-
MBA 512	Marketing Management	3	-
MBA 513	Managerial Economics	3	-
MBA 514	Organizational Behavior	3	-
MBA 515	Business Analytics	3	MBA 511
MBA 516	Managerial Finance	3	MBA 513
MBA 522	Operations Strategy	3	MBA 511

##### Subject Courses (12 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 529	Marketing Strategy	3	MBA 512, MBA 515
MBA 536	Digital and Social Media Marketing	3	MBA 512
MBA 550	Services Marketing	3	MBA 512
MBA 580	Consumer Behavior and Insights	3	MBA 512

##### Elective Courses (6 Credit Hours; choose two courses)

Course No.	Course Name	Cr.	Prerequisite
MBA 527	Marketing Intelligence	3	MBA 512
MBA 531	Marketing Research Project	3	MBA 527
MBA 571	Integrated Marketing Communications	3	MBA 512
MBA 537	Global Marketing	3	MBA 512

#### Suggested Study Plan

Semester 1				Semester 2			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr.	Pre-req
MBA 511	Quantitative An.	3	-	MBA 510	Financial Accounting	3	MBA 511
MBA 513	Managerial Econ.	3	-	MBA 512	Mkt Management	3	-
MBA 514	Organizat. Beh.	3	-	MBA 516	Managerial Fin.	3	MBA 513
				Elective	(Summer)	3	-
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr.	Pre-req
MBA 515	Business Analytics	3	MBA 511	MBA 529	Mkt Strategy	3	MBA 512
MBA 522	Op. Strategy	3	MBA 511	MBA 550	Services Marketing	3	MBA 512
MBA 536	Dig. and Soc. Med.	3	MBA 512	MBA 580	Cons. Beh. & Insights	3	MBA 512
				Elective	(Summer)	3	-
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>12</b>	

### 5.1.4 Finance

#### Curriculum

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

Type of Courses	Compulsory	Elective	Total
Core	27	-	27
Subject	12	-	12
Electives	-	3	3
<b>Total</b>	<b>39</b>	<b>3</b>	<b>42</b>

##### Core Courses (39 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 515	Business Analytics	3	MBA 511
MBA 516	Managerial Finance	3	MBA 513
MBA 519	Strategic Management	3	MBA 514, 515, 516, 522
MBA 522	Operations Strategy	3	MBA 511
MBA 549	Corporate Finance	3	MBA 516
MBA 551	Derivative Securities	3	MBA 549
MBA 561	Investments & Portfolio Theory	3	MBA 516

##### Elective Courses (3 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 540	Islamic Finance	3	MBA 516
MBA 544	Financial Statement Analysis & Valuation	3	MBA 516
MBA 553	Bank Management	3	MBA 516
MBA 568	Financial Econometrics	3	MBA 511, 516
MBA 570	Risk Management	3	MBA 516
MBA 574	Global Economics	3	MBA 513
MBA 591	Insurance	3	MBA 516

#### Suggested Study Plan

Semester 1				Semester 2			
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 512	Marketing Mangment	3	-
MBA 514	Organizat Behav	3	-	MBA 516	Managerial Finance	3	MBA 513
				MBA 553	Bank Magmt (summer)	3	MBA 516
	<b>TOTAL</b>	<b>9</b>			<b>TOTAL</b>	<b>12</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr.	Pre-req
MBA 515	Business Analytics	3	MBA 511	MBA 519	Strategic Management	3	MBA 514, 515, 516, 522
MBA 522	Operations Strat	3	-	MBA 561	Invest & Portf Theory	3	MBA 516
MBA 549	Corporate Finance	3	MBA 516	MBA 551	Derivative Securities	3	MBA 516
				Elective (Summer)		3	-
	<b>TOTAL</b>	<b>9</b>			<b>TOTAL</b>	<b>12</b>	

### 5.1.5 Healthcare Management

#### Curriculum

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

Type of Courses	Compulsory	Elective	Total
Core	27	-	27
Subject	12	-	12
Electives	-	3	3
Total	39	3	42

##### Core Courses (39 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 510	Financial Accounting	3	MBA 511
MBA 511	Quantitative Analysis for Business	3	
MBA 513	Managerial Economics	3	
MBA 514	Organizational Behavior	3	
MBA 515	Business Analytics	3	MBA 511
MBA 512	Marketing Management		
MBA 516	Managerial Finance	3	MBA 513
MBA 519	Strategic Health Management	3	MBA 514, 515, 516, 522
MBA 522	Operations Strategy	3	MBA 511
MBA 560	Healthcare Management	3	
MBA 562	Health Informatics	3	MBA 560
MBA 563	Management Control & Performance Measurement	3	MBA 560

##### Elective Courses (3 Credit Hours))

Course No.	Course Name	Cr.	Prerequisite
MBA 512	Marketing Management	3	-
MBA 534	Leading Organizational Change	3	MBA 514
MBA 538	Entrepreneurship and Innovation	3	MBA 512
MBA 541	HR Planning, Recruitment & Selection	3	MBA 518
MBA 542	Contemporary Economics & Financial Issues	3	MBA 513
MBA 544	Financial Statement Analysis & Security Valuation	3	MBA 516
MBA 545	Independent Study	3	MBA 511, 514, 515
MBA 546	Comparative Management	3	MBA 514
MBA 549	Corporate Finance	3	MBA 516
MBA 550	Service Marketing	3	MBA 512
MBA 551	Derivatives Securities	3	MBA 516
MBA 553	Bank Management	3	MBA 516
MBA 555	Corporate Governance. Business Ethics & CSR	3	MBA 516, 514
MBA 558	Value Innovation Strategy	3	MBA 512
MBA 561	Investment & Portfolio Theory	3	MBA 516
MBA 565	HR Development & Performance	3	MBA 518
MBA 573	Applied Econometrics	3	MBA 515
MBA 574	Global Economics	3	MBA 513
MBA 575	Negotiations	3	MBA 514
MBA 580	Consumer Behaviour & Insights	3	MBA 512
MBA 581	Managerial Decision Making	3	MBA 515
MBA 582	Total Quality Management	3	MBA 511
MBA 590	Real Estate Analysis	3	MBA 516

#### Suggested Study Plan

Semester 1				Semester 2			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr.	Pre-req
MBA 511	Quant Anal Bus	3	-	MBA 510	Financial Accounting	3	MBA 511
MBA 513	Managerial Econ	3		MBA 516	Managerial Finance	3	MBA 513
MBA 514	Organiz Behavior	3		MBA 512	Marketing Management	3	-
	TOTAL	9			TOTAL	9	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr.	Pre-req
MBA 522	Operations Strat	3	MBA 511	MBA 519	Strategic Management	3	MBA 514, 515, 516, 522
MBA 515	Business Analytics	3	MBA 511	MBA 563	Mngmt Control & Perf	3	MBA 560
MBA 560	Healthcare Manag	3	MBA 513	MBA 562	Hlth Informatics	3	MBA 560
Elective	(Summer)	3		Elective	(Summer)	3	
	TOTAL	12			TOTAL	12	

## 5.1.6 Human Capital Management

### Curriculum

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

Type of Courses	Compulsory	Elective	Total
Core	24	-	24
Subject	12	-	12
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 Business	3	
MBA 513	Managerial Economics	3	
MBA 514	Organizational Behavior	3	
MBA 515	Business Analytics	3	MBA 511
MBA 516	Managerial Finance	3	MBA 513
MBA 518	Human Resources Management	3	MBA 514
MBA 519	Strategic Health Management	3	MBA 514,515,516,522
MBA 522	Operations Strategy	3	MBA 511
MBA 541	HR Planning, Recruitment & Selection	3	MBA 518
MBA 534	Leading Organizational Change	3	MBA 514
MBA 565	HR Development and Performance	3	MBA 518

#### Elective Courses (6 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBA 585	Leadership in Organizations: Principles & Practice	3	MBA 514
MBA 538	Entrepreneurship and Innovation	3	MBA 512
MBA 512	Marketing Management	3	
MBA 545	Independent Study	3	MBA 515, 514
MBA 546	Comparative Management	3	MBA 514
MBA 555	Corporate Governance. Business Ethics & CSR	3	MBA 516, 514
MBA 558	Value Innovation Strategy	3	MBA 512
MBA 580	Consumer Behaviour & Insights	3	MBA 512
MBA 581	Managerial Decision Making	3	MBA 515
MBA 582	Total Quality Management	3	MBA 511
MBA 547	Contemporary International Management Issues	3	MBA 514

### Suggested Study Plan

Semester 1				Semester 2			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBA 511	Quant Anal Bus	3	-	MBA 510	Financial Accounting	3	MBA 511
MBA 513	Managerial Econ	3		MBA 516	Managerial Finance	3	MBA 513
MBA 514	Organiz Behavior	3		MBA 534	Leading Organiz Change	3	MBA 514
				Elective	(Summer)	3	
	TOTAL	9			TOTAL	12	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBA 515	Business Analytics	3	MBA 511	MBA 519	Str Hlth Management	3	MBA514,515, 516,522
MBA 522	Operations Strat	3	MBA 511	MBA 541	HR Plan, Recr & Select	3	MBA 518
MBA 518	HR Management	3	MBA 518	MBA 565	HR Dev & Performance	3	MBA 518
				Elective	(Summer)	3	
	TOTAL	9			TOTAL	12	

## 5.2 Master of Biomedical Sciences (MBS)

### 5.2.1 Analytical Biochemistry

#### Curriculum

##### Credit Hours Required for a Master of Science in Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	15	-	15
Thesis	18	-	18
Free Electives	-	-	-
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

##### 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) 18

**TOTAL CREDIT HOURS REQUIRED 42**

#### Suggested Study Plan

Semester 1				Semester 2			
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 Method	3		MBS 551	OMICS tech & applications	3	
MBS 500	Basics Mol Cell Biol	3		MBS 552	Advanced analytical Biochem	3	
MBS 505	Adv Biochemistry	3		MBS 553	Analyt Techn Clin Biochem	3	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr	Pre-req
MBS 600	Thesis A	9		MBS 600	Thesis B	9	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

## 5.2.2 Biotechnology

### Curriculum

#### Credit Hours Required for a Master of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	15	-	15
Thesis	18	-	18
Free Electives	-	-	-
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

#### 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)		18	
<b>TOTAL CREDIT HOURS REQUIRED</b>		<b>42</b>	

### Suggested Study Plan

Semester 1				Semester 2			
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	
MBS 505	Adv Biochemistry	3		MBS 542	Techniq Biotechnology	3	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis A	9		MBS 600	Thesis B	9	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

### 5.2.3 Clinical Anatomy

#### Curriculum

##### Credit Hours Required for a Master of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	12	-	12
Subject	12		12
Research Thesis	18	-	18
Free Electives	-		
<b>Total</b>	<b>42</b>		<b>42</b>

##### Core Courses (12 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	3	
REC 503	Research Methodologies	3	
REC 504	Biomedical Ethics	3	-
MBS 500	Basics in Molecular and Cell Biology	3	

##### Subject Courses (12 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MBS 506	Human Gross Anatomy	3	
MBS 507	Clinical Embryology	2	
MBS 508	Human Neuroanatomy	2	
MBS 509	Histology and Cell biology	3	
MBS 510	Clinical Rotations in Surgery, Radiology and Pathology	2	

Core and Subject courses: 24

Thesis (MBS 600) 18

**TOTAL CREDIT HOURS REQUIRED 42**

#### Suggested Study Plan

Semester 1				Semester 2			
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 507	Clinical Embryology	2	
MBS 506	Human Gross Anat	3		MBS 508	Head & Neck & Neuroanatomy	2	
MBS 500	Basics Molec Cell Biol	3		MBS 509	Histology and Cell biology	3	
				MBS 510	Clin Rot Surgery, Radiol & Path	2	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-rq	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis A	9		MBS 600	Thesis B	9	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	



## 5.2.4 Clinical Embryology & Reproductive Biology

### Curriculum

#### Credit Hours Required for a Master of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	15	-	15
Thesis	18	-	18
Free Electives	-	-	-
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

#### 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) 18

**TOTAL CREDIT HOURS REQUIRED 42**

### Suggested Study Plan

Semester 1				Semester 2			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr	Pre-req
REC 502	Biostatistics	3		REC 503	ResMethodologies	3	-
REC 504	Biomedical Ethics	3		MBS 522	Intro Assisted Reprod	2	
MBS 500	Bas Molec Cell Biology	3		MBS 523	Infert Reprod Med	2	
MBS 521	Repr Biology Embryol	2		MBS 524	Sem anal proc/Androl	2	
				MBS 527	Pract Molecular Biol	2	
<b>TOTAL</b>		<b>11</b>		<b>TOTAL</b>		<b>11</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No.	Course Name	Cr	Pre-req
MBS 600	Thesis-A	9		MBS 600	Thesis-B	9	
MBS 525	Adv Assisted Reprod	2					
<b>TOTAL</b>		<b>11</b>		<b>TOTAL</b>		<b>9</b>	

## 5.2.5 Infection Control

### Curriculum

#### Credit Hours Required for a Master of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	18		18
Thesis	18	-	18
Free Electives	-		
Total	45		45

#### 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) 18

**TOTAL CREDIT HOURS REQUIRED 45**

### Suggested Study Plan

Semester 1				Semester 2			
Course No.	Course Name	Cr.	Pre-rq	Course No	Course Name	Cr	Pre-req
RESC 501	Statistics I	3	Math	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		MBS 535	Patient care proc & evid based inf control pract	3	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-rq	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis-A	9		MBS 600	Thesis-B	9	
MBS 536	Compet in Inf Control	3					
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>9</b>	

## 5.2.6 Laboratory Quality Management Curriculum

Credit Hours required for a Master of Biomedical Sciences

Type of Course	Compulsory	Elective	Total
Core	9	-	9
Subject	15	-	15
Thesis	18	-	18
Free Electives	-	-	-
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

### 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
MBA 514	Organizational Behavior	3	-
MBS 558	Laboratory Quality Systems & Accreditation	2+1	-
MBS 560	Method Comparison & Validation (NEW)	2+1	-
MBA 560	Healthcare Management	3	MBA 514
MBA 585/ MBA 534	Leadership in Organizations / Leading Organizational Change	3	MBA 514

Core and Subject courses:	24
Thesis (MBS 600)	18
<b>TOTAL CREDIT HOURS REQUIRED</b>	<b>42</b>

### Suggested Study Plan

Semester 1				Semester 2			
Course	Course Name	Cr	Pre	Course No	Course Name	Cr	Pre
REC 502	Biostatistics	3	-	REC 503	Res Methodologies	3	-
REC 504	Biomedical Ethics	3	-	MBS 558	Lab Quality Syst & Accred	2+1	-
MBA 514	Organizational Behavior	3	-	MBA 585/	Leadership in Org / Leading	3	MBA 514
MBS 560	Method Comp & Validation	2+1	-	MBA 534	Organizational Change		
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>9</b>	
Semester 3				Semester 4			
Course	Course Name	Cr	Pre	Course	Course Name	Cr	Pre
MBA 560	Healthcare Management	3	MBA 514	MBS 600	Thesis B	9	
MBS 600	Thesis A	9					
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>9</b>	

## 5.2.7 Molecular & Cell Biology

### Curriculum

#### Credit Hours Required for a Master of Biomedical Sciences

Type of Courses	Compulsory	Elective	Total
Core	9	-	9
Subject	15		15
Thesis	18	-	18
Free Electives	-		
Total	42		42

#### 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) 18

**TOTAL CREDIT HOURS REQUIRED 42**

### Suggested Study Plan

Semester 1				Semester 2			
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
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr.	Pre-req	Course No	Course Name	Cr	Pre-req
MBS 600	Thesis-A	9		MBS 600	Thesis-B	9	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

## 5.2.8 Transfusion Medicine & Stem Cells

### Curriculum

#### Credit Hours required for Master of Biomedical Sciences

Type of Course	Compulsory	Elective	Total
Core	9	-	9
Subject	15	-	15
Research Thesis	18	-	18
Free Electives	-	-	-
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

#### 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 554	Transfusion Medicine and Blood Banking	2+1	-
MBS 555	Molecular Diagnostics in Blood Transfusion	2+1	-
MBS 556	Stem cell Transplantation Technology	2+1	-
MBS 557	Pathogenesis of Blood Disorders	2+1	-
MBS 558	Quality Management and Laboratory Accreditation	2+1	-
MBS 600 Thesis (cr)		18	
<b>TOTAL CREDIT HOURS REQUIRED</b>		<b>42</b>	

### Suggested Study Plan

Semester 1				Semester 2			
Course	Course Name	Cr	Pre	Course No	Course Name	Cr	Pre
REC 502	Biostatistics	3	-	REC 503	Res Methodologies	3	-
REC 504	Biomedical Ethics	3	-	MBS 556	Stem cell Trans Techn	2+1	-
MBS 554	Transf Med & Blood Bank	2+1	-	MBS 557	Path blood Disorders	2+1	-
MBS 555	Molec Diagn in Bld Transf	2+1	-	MBS 558	Qual Man & Lab Accrd	2+1	-
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Course Name	Cr	Pre	Course	Course Name	Cr	Pre
MBS 600	Thesis A	9		MBS 600	Thesis B	9	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

## 5.3 Master of Cardiac Nursing (MCN)

### *Curriculum*

#### Credit Hours Required for a Master of Cardiac Nursing

Type of Courses	Total Credit Hours
Core Courses (including Practicum)	36
Project/Capstone	6
<b>Total</b>	<b>42</b>

#### Core Courses (36 credits)

Course No.	Course Name	Cr
MCN 511	Cardiovascular Pulmonary 1	3
MCN 512	Cardiology Diseases	3
MCN 514	Quality and Safety Consideration in Nursing Care	3
MCN 521	Cardiovascular Pulmonary 2	3
MCN 522	Clinical Cardiology (Pediatrics, Adults) & Intensive care	3
MCN 523	Evidence-based Practice	3
MCN-C 531	Clinical Pediatric Cardiology	3
MCN-C 532	Clinical Adult Cardiology	3
MCN-C 533	Clinical Cardiac Surgery	3
MCN-C 534	Clinical Cardiac Intensive Care	3
REC 503	Research Methodologies	3
REC 504	Biomedical Ethics	3
Core Courses		36
MCN 601	Capstone Project	6
<b>TOTAL CREDIT HOURS REQUIRED</b>		<b>42</b>

### *Suggested Study Plan*

Semester 1			Semester 2		
Course No.	Course Name	Cr	Course No.	Course Name	Cr
MCN 511	Cardiovascular pulmonary	3	MCN 521	Cardiovascular Pulmonary 2	3
MCN 512	Cardiology Diseases	3	MCN 522	Clinical Cardiology	3
REC 504	Biomedical Ethics	3	MCN 523	Evidenced based practice	3
MCN 514	Quality and safety consideration	3	REC 503	Research methodologies	3
<b>TOTAL</b>		<b>12</b>	<b>TOTAL</b>		<b>12</b>
Semester 3			Semester 4		
Course No.	Course Name	Cr	Course No.	Course Name	Cr
MCN-C 531	Clinical Pediatric Cardiology	3	MCN 601	Project/Capstone	6
MCN-C 532	Clinical Adult Cardiology	3	MCN-C 534	Clinical Cardiac Intensive care	3
MCN-C 533	Clinical Cardiac surgery	3			
<b>TOTAL</b>		<b>9</b>	<b>TOTAL</b>		<b>9</b>

## 5.4 Master of Clinical Psychology (MCP)

### Curriculum

#### Credit Hours Required for a Master of Clinical Psychology

Type of Courses	Compulsory	Elective	Total
Subject	24	-	24
Practicums & Clinical Internship Rotations	24		24
Research/Capstone Project	6	-	6
<b>Total</b>	<b>54</b>	<b>-</b>	<b>54</b>

#### Subject Courses (24 Credit Hours)

Course No	Course Name	Cr.	Prerequisite
MCP 500	Neuropsychology	3	-
MCP 501	Clinical Psychology	3	-
MCP 502	Schools of Psychotherapies	3	-
MCP 503	Case Formulation	3	-
MCP 504	Assessment and Clinical Interview	3	-
MCP 505	Cognitive Behavioral Therapy	3	
REC 502	Biostatistics	3	
REC 504	Biomedical Ethics	3	

#### Clinical Rotations & Internship (24 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MCP-C 506	Neurorehabilitation Unit	6	
MCP-C 507	Child and Adolescent Psychology Unit	6	
MCP-C 508	Neuropsychology Unit	6	
MCP-C 509	Adult Psychology Unit	6	

Subject, Clinical Courses and Internship:	48
Research/Capstone Project (MCP 601 A-B)	6

<b>TOTAL CREDIT HOURS REQUIRED</b>	<b>54</b>
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### Suggested Study Plan

Semester 1				Semester 2			
Course No.	Course Name	Cr	Prerq	Course No	Course Name	Cr	Prerq
MCP 500	Neuropsychology	3		MCP 503	Case Formulation	3	-
MCP 501	Clinical Psychology	3	-	MCP 504	Assessment & Clinical Interview	3	-
MCP 502	Schools Psychotherap	3	-	MCP 505	Cogn Behavior Therapy	3	-
REC 504	Biomedical Ethics	3	-	REC 502	Biostatistics	3	-
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course No.	Course Name	Cr	Prerq	Course No	Course Name	Cr	Prerq
MCP-C 506	Neurorehabilitation Unit*	6	-	MCP-C 506	Neurorehabilitation Unit*	6	-
MCP-C 507	Child Adol Psych Unit*	6	-	MCP-C 507	Child Adol Psych Unit*	6	-
MCP-C 509	Adult Psychology Unit *	6	-	MCP-C 509	Adult Psychology Unit *	6	-
MCP-C 508	Neuropsychology Unit*	6	-	MCP-C 508	Neuropsychology Unit*	6	-
MCP 601-A	Research/Capstone Project	3		MCP 601-B	Research/Capstone Project	3	
<b>TOTAL</b>		<b>15</b>		<b>TOTAL</b>		<b>15</b>	

\*Two of the courses will be taken in 3<sup>rd</sup> and 4<sup>th</sup> semester by different groups

## 5.5 Master of Clinical Speech- Language Pathology (MSP)

### Curriculum

#### Credit Hours Required for an MSc in Clinical Speech-Language Pathology

Type of Courses	Compulsory	Total
Core Courses	6	6
Subject Courses	21	21
Practicum	9	9
Project	6	6
<b>Total</b>	<b>42</b>	<b>42</b>

#### Core Courses (6 Credit Hours)

Course No.	Course Name	Cr.	Prereq
REC 503	Research Methodologies	3	-
REC 502	Biostatistics	3	-

#### Subject Courses (21 Credit Hours)

Course No.	Course Name	Cr.	Prereq
MSP 500	Clinical Methods and Ethical Considerations	3	
MSP 501	Feeding and Swallowing Disorders	3	
MSP 502	Fluency and Speech Sounds Disorders	3	
MSP 503	Neurogenic Acquired Com Disorders	3	
MSP 504	Alternative & Augmented Communication	3	
MSP 505	Developmental Language Disorders	3	
MSP 509	Principles of Voice Production & Disorders	3	

#### Project (6 Credit Hours)

Course No.	Course Name	Cr.	Prereq
MSP 601	Project	6	

#### Practicum (9 Credit Hours)

Course No.	Course Name	Cr.	Prereq
MSP 514	Practicum I: Pediatric Populations	3	
MSP 515	Practicum II: Adult Populations	3	
MSP 516	Practicum III: Specialized Populations	3	

### Suggested Study Plan

Semester 1				Semester 2			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-rq
MSP 500	Clin Meth & Ethical Consider	3	-	MSP 504	Alt & Augmented Com	3	-
MSP 501	Feeding & Swallowing Dis	3	-	MSP 505	Dev Language Disorders	3	-
MSP 502	Fluency & Speech Sounds Dis	3	-	MSP 515	Practicum II: Adult Pop	3	-
MSP 514	Practicum I: Pediatric Pop	3	-	REC 503	Research Methodologies	3	-
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course #	Course Name	Cr	Pre-req	Course #	Course Name	Cr	Pre-rq
REC 502	Biostatistics	3		MSP 601	Project	6	
MSP 503	Neurogenic Acq Com Dis	3		MSP 509	Princ Voice Prod & Dis	3	
MSP 516	Practicum III: Ped Pop	3					
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	



## 5.6 Master of Engineering & Systems Management (MEM)

### Curriculum (Thesis Option)

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

Type of Courses	Compulsory	Elective	Total
Core	12	-	12
Elective (track)	-	12	12
Thesis	18	-	18
<b>Total</b>	<b>30</b>	<b>12</b>	<b>42</b>

#### Core Courses (4 Courses, 12 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MEM 501	Statistics and Data Analytics	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	

#### Elective Courses: Choose 4 courses (12 Cr hrs.); students may take non-listed courses with dept. approval

##### Track 1: Decision Analysis & Data Analytics

Course No.	Course Name	Cr	Prerequisite
MEM 502	Systems Architecture and Engineering	3	
MEM 506	Leadership Development for Engineers & Systems Managers	3	
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 502	Systems Architecture and Engineering	3	
MEM 506	Leadership Development for Engineers & Systems Managers	3	
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: Intelligent Industrial Systems

Course No.	Course Name	Cr	Prerequisite
MEM 507	Applied Computation and Data Science	3	MEM 501
MEM 512	Special Topics I	3	Dept. App.
MEM 513	Special Topics II	3	Dept. App.
MEM 524	Artificial Intelligence	3	Dept. App.
MEM 525	Machine Learning	3	Dept. App.
MEM 526	Advanced Big data	3	Dept. App.
MEM 527	Industrial Internet of Things (IIoT)	3	Dept. App.

Core and elective courses: 24

Thesis (MEM 600) 18

**TOTAL CREDIT HOURS REQUIRED 42**

### Suggested Study Plan

Semester 1				Semester 2			
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 503	Proj Progr Mngt Comp Syst	3		MEM 505	Oper Eng & Management	3	
MEM	Elective	3		MEM	Elective	3	
MEM	Elective	3		MEM	Elective	3	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-req
MEM 600	Thesis-A	9		MEM 600	Thesis-B	9	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

## Curriculum (Courses-Only Option)

### Credit Hours Required for a Master of Engineering & Systems Management

Type of Courses	Compulsory	Elective	Total
Core	12	-	12
Elective (track)	-	24	24
Research/Capstone Project	6	-	6
<b>Total</b>	<b>18</b>	<b>24</b>	<b>42</b>

#### Core Courses (4 Courses, 12 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
MEM 501	Statistics and Data Analytics	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	

#### Elective Courses: Choose 8 courses (24 Cr hrs.); students may take non-listed courses with dept. approval

##### Track 1: Decision Analysis & Data Analytics

Course No.	Course Name	Cr	Prerequisite
MEM 502	Systems Architecture and Engineering	3	
MEM 506	Leadership Development for Engineers & Systems Managers	3	
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 502	Systems Architecture and Engineering	3	
MEM 506	Leadership Development for Engineers & Systems Managers	3	
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: Intelligent Industrial Systems

Course No.	Course Name	Cr	Prerequisite
MEM 507	Applied Computation and Data Science	3	MEM 501
MEM 512	Special Topics I	3	Dept. App.
MEM 513	Special Topics II	3	Dept. App.
MEM 524	Artificial Intelligence	3	Dept. App.
MEM 525	Machine Learning	3	Dept. App.
MEM 526	Advanced Big data	3	Dept. App.
MEM 527	Industrial Internet of Things (IIoT)	3	Dept. App.

Core and elective courses: 36

Research/Capstone Project (MEM 601) 6

**TOTAL CREDIT HOURS REQUIRED 42**

### Suggested Study Plan

Semester 1				Semester 2			
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 503	Proj Progr Mngt Comp Syst	3		MEM 505	Oper Eng & Management	3	
MEM	Elective	3		MEM	Elective	3	
MEM	Elective	3		MEM	Elective	3	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-req
MEM	Elective	3		MEM	Elective	3	
MEM	Elective	3		MEM 601	Research/Capstone Project	6	
MEM	Elective	3					
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

## 5.7 Master of Genetic Counselling (MGC)

### Curriculum

#### Credit Hours Required for a Master of Genetic Counselling

Type of Courses	Compulsory	Elective	Total
Subject	21	-	21
Practicums & Clinical Rotations	15	-	15
Research/Capstone Project	6	-	6
Clinical Internship	0	-	0
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

#### Subject Courses (21 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MGC 501	Topics in Genetic Counseling I	2	-
MGC 502	Topics in Genetic Counseling II	2	-
MGC 503	Psychosocial Aspects 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	-
MGC 518	Intro to Med & Pop Genetics I	2	-
MGC 519	Intro to Med & Pop Genetics II	2	-
REC 503	Research Methodology	3	-

#### Practicums & Clinical Rotations (15 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MGC 506	Biochemical & Newborn Lab Practicum	2	
MGC 508	Molecular Genetics Practicum	2	
MGC 510	Observational Clinic Rotation	1	
MGC 511	Medical Genetics Clinic Practicum	2	
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

Semester 1				Semester 2			
Course No.	Course Name	Cr.	Pre-rq	Course No.	Course Name	Cr.	Pre-rq
MGC 501	Top in Gen Counseling I	2	-	MGC 502	Top in Gen Counseling II	2	MGC 501
MGC 505	Cancer Gen Counseling	2	-	MGC 510	Obs Clinical Rotation	1	-
MGC 509	Intro Anat & Physiology	2	-	MGC 516	Cytogenetics Lab Prac	2	-
MGC 515	Gen Counseling & Islam	2	-	MGC 519	Intro Med & Pop Gen II	2	MGC 518
MGC 518	Intro Med & Pop Gen I	2	-	REC 503	Research Methodology	3	
<b>TOTAL</b>		<b>10</b>		<b>TOTAL</b>		<b>10</b>	
Semester Summer				Semester 4			
MGC 517	Clinical Internship	0					
Course No.	Course Name	Cr.	Pre-rq	Course No.	Course Name	Cr.	Pre-rq
MGC 503	Psyc Asp Gen Counsel	2		MGC 512	Prenatal Clinic Prac	2	
MGC 504	Gen Basis Inher Dis	2		MGC 513	Adv Med Gen Clin Prac	2	
MGC 506	Bioch Newb Scr Prac	2		MGC 514	Ultrasound Clinic Prac	2	
MGC 508	Mol Gen Lab Prac	2		MGC 601	Res/Capstone Project	6	
MGC 511	Med Gen Clin Prac	2					
<b>TOTAL</b>		<b>10</b>		<b>TOTAL</b>		<b>12</b>	

## 5.8 Master of Nanoscience & Nanotechnology (MNT)

### 5.8.1 Cancer Nanoscience

#### Curriculum

##### Credit Hours Required for a Master of Nanoscience & Nanotechnology

Type of Courses	Compulsory	Elective	Total
Core	12	-	12
Subject	9	3	12
Thesis	18	-	18
<b>Total</b>	<b>39</b>	<b>3</b>	<b>42</b>

##### 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) choose 3 subject courses

Course No.	Course Name	Cr.	Prerequisite
MNT 551	Cancer mechanisms as therapy targets	3	
MNT 552	Advanced Topic in Cancer Biology and Theranostics	3	MNT 551
MNT 553	Cancer Informatics	3	MNT 551
REC 503	Research Methodologies	3	

##### Elective Courses (3 Credit Hours): choose one elective course from below

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
MNT 513	Topics in Nanomaterial Science	3	MNT 510, MNT530

Core and Subject courses:	24
Thesis (MNT 600)	18
<b>TOTAL CREDIT HOURS REQUIRED</b>	<b>42</b>

#### Suggested Study Plan

Semester 1				Semester 2			
Course	Course Name	Cr.	PreR	Course	Course Name	Cr	Pre-req
MNT 510	Intr Nanos Nanotech I	3		MNT 520	Intr Nanosci Nanotech II	3	
MNT 530	Exp Techn in Nanot I	3		MNT 540	Exp Techn Nanotech II	3	MNT 510 MNT 530
MNT 551	Canc mech ther targ	3		MNT 552	Adv TopCanc Biol & Ther	3	MNT 510 MNT 551
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Course Name	Cr.	Prereq	Course	Course Name	Cr	Pre-req
MNT 600	Thesis A	9		MNT 600	Thesis B	9	
MNT 553	Canc Gen & Bioinfo	3					
MNT elec		3					
<b>TOTAL</b>		<b>15</b>		<b>TOTAL</b>		<b>9</b>	

## 5.8.2 Nanomaterials for Energy & Environmental Applications

### Curriculum

#### Credit Hours Required for a Master of Nanoscience & Nanotechnology

Type of Courses	Compulsory	Elective	Total
Core	12	-	12
Subject	12	-	12
Thesis	18	-	18
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

#### 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

#### 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

#### Subject Courses (9 Credit Hours) choose 3 courses

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
REC 503	Research Methodologies	3	

Core and Subject courses: 24

Thesis (MNT 600) 18

**TOTAL CREDIT HOURS REQUIRED 42**

### Suggested Study Plan

Semester 1				Semester 2			
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
MNT	Subject	3		MNT 513	Topics Nanomat Sci	3	MNT510, MNT530
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Course Name	Cr.	PreR	Course	Course Name	Cr	Pre-req
MNT 600	Thesis A	9		MNT 600	Thesis B	9	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

### 5.8.3 Nanomedicine & Nanodiagnostics

#### Curriculum

##### Credit Hours Required for a Master of Nanoscience & Nanotechnology

Type of Courses	Compulsory	Elective	Total
Core	12	-	12
Subject	12	-	12
Thesis	18	-	18
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

##### 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) choose 3 courses

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
REC 503	Research Methodologies	3	

##### 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) 18

**TOTAL CREDIT HOURS REQUIRED 42**

#### Suggested Study Plan

Semester 1				Semester 2			
Course	Course Name	Cr.	PreR	Course	Course Name	Cr	Pre-req
MNT 510	Intr Nanos Nanotech I	3		MNT 520	Intr Nanosci Nanotech II	3	
MNT 530	Exp Techn in Nanot 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
MNT	Subject	3		MNT 504	Biosens Lab chip	3	MNT510MNT530
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Course Name	Cr.	Prereq	Course	Course Name	Cr	Pre-req
MNT 600	Thesis A	9		MNT 600	Thesis B	9	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

## 5.9 Master of Public Health (MPH)

### 5.9.1 Biostatistics & Epidemiology

#### Curriculum (Courses-Only Option)

Credit Hours required for a Master 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
<b>Total</b>	<b>37</b>	<b>6</b>	<b>43</b>

#### Core Courses (18 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
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	
REC 502	Biostatistics	3	

#### Subject Courses (9 Credit Hours)

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

#### Elective Courses (Choose 6 Credit Hours)

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

Semester 1				Semester 2			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
REC 502	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	REC 502
MPH 504	Communicable Diseases	3		MPH 508	Advanced Epidemiology	3	MPH 502
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
MPH 509	Regression Analysis	3	REC 502	MPH 525	Practicum	3	
MPH	Elective	3		MPH 601	Res/Capstone Project	6	
MPH	Elective	3		MPH 526	Seminar	1	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>10</b>	

## 5.9.2 Healthcare Policy & Management

### Curriculum (Thesis Option)

Credit Hours required for a Master of Public Health

Type of Courses	Compulsory	Elective	Total
Core	15	-	18
Subject	6	-	9
Elective	-	-	6
Practicum	3	-	3
Thesis	18	-	6
Seminar	1	-	1
<b>Total</b>	<b>43</b>	<b>0</b>	<b>43</b>

#### Core Courses (15 Credit Hours)

Course	Name	Cr	Prerequisite
REC 502	Biostatistics	3	
MPH 502	Principles of Epidemiology	3	
MPH 503	Environmental and Occupational Health	3	
MPH 506	Social & Behavioral Determinants of Health	3	
MPH 527	Communicable & Noncommunicable Diseases	3	

#### Subject Courses (6 Credit Hours)

Course	Name	Cr	Prerequisite
MPH 513	Health Insurance & Health Policy	3	REC 502, MPH 502
MPH 515	Healthcare Management	3	REC 502, MPH 502

Core and Subject courses:	21
Practicum (MPH 525):	3
Thesis (MPH 600)	18
Seminar (MPH 526)	1

**TOTAL CREDIT HOURS REQUIRED 43**

### Suggested Study Plan

Semester 1				Semester 2			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
REC 502	Biostatistics	3		MPH 525	Practicum	3	
MPH 502	Principles Epidemiology	3		MPH 506	Soc & Behav Deter Health	3	
MPH 503	Environ Occupat Health	3		MPH 515	Healthcare Management	3	
MPH 513	Health Ins & Hlth Policy	3		MPH 527	Comm & Non Comm Dis	3	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
MPH 600	Thesis A	9		MPH 600	Thesis B	9	
MPH 526	Seminar	1					
<b>TOTAL</b>		<b>10</b>		<b>TOTAL</b>		<b>9</b>	



## Curriculum (Courses Only Option)

### Credit Hours required for a Master of Science in 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
<b>Total</b>	<b>37</b>	<b>6</b>	<b>43</b>

#### Core Courses (18 Credit Hours)

Course	Name	Cr	Prerequisite
REC 502	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 Insurance & Health Policy	3	REC 502, MPH 502
MPH 514	Quality Assurance in Public Health	3	REC 502, MPH 502
MPH 515	Healthcare Management	3	REC 502, MPH 502

#### Elective Courses (Students choose 6 Credit Hours)

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

Semester 1				Semester 2			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
REC 502	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 Ins & Hlth Policy	3	REC502,MPH502
MPH 504	Communicable Diseases	3		MPH 514	Qual Assur Publ Health	3	REC502,MPH502
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
MPH 515	Healthcare Manag	3	REC502,MPH502	MPH 525	Practicum	3	
MPH	Elective	3		MPH 601	Res/Capstone Project	6	
MPH	Elective	3		MPH 526	Seminar	1	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>10</b>	

### 5.9.3 Mass Gatherings Health (Hajj & Umrah)

#### Curriculum (Thesis Option)

##### Credit Hours required for a Master of Public Health

Type of Courses	Compulsory	Elective	Total
Core	19		19
Subject	6		6
Thesis	18		18
<b>Total</b>	<b>43</b>		<b>43</b>

##### Core Courses (19 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	3	
MPH 502	Principles of Epidemiology	3	
MPH 503	Environmental and Occupational Health	3	
MPH 506	Social & Behavioral Determinants of Health	3	
MPH 525	Practicum	3	
MPH 526	Seminar	1	
MPH 527	Communicable & Non-Communicable Diseases	3	

##### Subject Courses (6 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MPH 510	Principles of Mass Gathering Health	3	REC502, MPH502
MPH 513	Health Insurance & Health Policy	3	REC502, MPH502

Core and Subject courses:	25
Thesis (MPH 600)	18

**TOTAL CREDIT HOURS REQUIRED 43**

#### Suggested Study Plan

Semester 1				Semester 2			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
REC 502	Biostatistics	3		MPH 503	Env Occupat Health	3	
MPH 502	Princ Epidemiology	3		MPH 506	Soc Behav Deter Health	3	
MPH 513	Health Ins & Hlth Policy	3		MPH 510	Princ Mass Gath Hlth	3	
MPH 527	Com & Non-Com Dis	3		MPH 525	Practicum	3	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
MPH 600	Thesis A	9		MPH 600	Thesis B	9	
MPH 526	Seminar	1					
<b>TOTAL</b>		<b>10</b>		<b>TOTAL</b>		<b>9</b>	

### Curriculum (Courses-Only Option)

#### Credit Hours required for a Master of Public Health

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
<b>Total</b>	<b>37</b>	<b>6</b>	<b>43</b>

#### Core Courses (18 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	3	
MPH 502	Principles of Epidemiology	3	
MPH 503	Environmental and Occupational Health	3	
MPH 504	Communicable Diseases	3	
MPH 505	Non-Communicable Diseases	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	REC 502, MPH 502
MPH 511	Principles of Disaster Management	3	REC 502, MPH 502
MPH 512	Emerging Infect & Infect Dis Management	3	MPH 505, MPH 502

#### Elective Courses (Students can choose 6 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MPH 523	Research Design	3	REC 502
MPH 524	Nutrition	3	
MPH 518	Ethics in Research	3	
MPH 519	Public Health & Healthcare Syst in KSA	3	REC502,MPH502
MPH 520	Health Economics	3	REC502,MPH502
MPH 521	Health Informatics	3	REC502,MPH502
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

Semester 1				Semester 2			
Course	Name	Cr.	PreR	Course	Name	Cr	Pre-req
REC 502	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	REC502,MPH502
MPH 504	Communicable Dis	3		MPH 511	Princ Disaster Manag	3	REC502,MPH502
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
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	
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>10</b>	

## 5.10 Master of Radiological & Imaging Sciences (MRS)

### 5.10.1 Radiological & Imaging Sciences

#### Curriculum (Thesis Option)

Credit Hours required for a Masters of Radiological & Imaging Sciences

Type of Courses	Compulsory	Elective	Total
Core	24	-	24
Thesis	18	-	18
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

#### Core Courses (24 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	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	

Core courses:	24
Thesis (MRS 600)	18
<b>TOTAL CREDIT HOURS REQUIRED</b>	<b>42</b>

#### Suggested Study Plan

Semester 1				Semester 2			
Course	Name	Cr.	PreR	Course	Name	Cr	PreR
REC 502	Biostatistics	3		MRS 502	Radiological Research	3	
MRS 503	Ethics in Radiology	2		MRS 505	Radiol & Imaging Sci II	3	
MRS 504	Radiol & Imaging Sci I	3		MRS 507	Topics Rad Therapy	3	
MRS 506	Topics Med Imaging	3		MRS 508	Topics Nuclear Med	3	
<b>TOTAL</b>		<b>11</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Name	Cr.	PreR	Course	Name	Cr	PreR
MRS 509	RIS Seminar	1		MRS 600	Thesis B	9	
MRS 600	Thesis A	9					
<b>TOTAL</b>		<b>10</b>		<b>TOTAL</b>		<b>9</b>	

## Curriculum (Courses-Only Option)

### 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
<b>Total</b>	<b>42</b>	<b>-</b>	<b>42</b>

#### Core Courses (24 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	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	
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

Semester 1				Semester 2			
Course	Name	Cr.	PreR	Course	Name	Cr	PreR
REC 502	Biostatistics	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	
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course	Name	Cr.	PreR	Course	Name	Cr	PreR
MRS 510	Academic Program Management	3		MRS 516	Clinical Accred & QM	3	
MRS 511	Faculty Development	3		MRS 601	Res/Capstone Project	6	
MRS 517	Professional Development	3					
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

### 5.10.2 Ultrasound

#### Curriculum

##### Credit Hours required for a Master of Science in Radiological & Imaging Sciences

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

##### Core Courses (24 Credit Hours)

Course No.	Course Name	Cr	Prerequisite
REC 502	Biostatistics	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 509	RIS Seminar	1	
MRS 518	Ultrasound Physics	3	
MRS 519	Sonography Cross-Sectional Anatomy	3	

##### Subject Courses (12 Credit Hours)

Course No.	Course Name	Cr.	Prerequisite
MRS 520	Abdominal Sonography	3	
MRS 521	Pelvic Sonography	3	
MRS 522	Obstetrical Sonography	3	
MRS 523	Clinical Sonography	3	
MRS 525	Musculoskeletal, Neonatal & Pediatric Sonography	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

Semester 1				Semester 2			
Course	Name	Cr.	PreR	Course	Name	Cr	PreR
REC 502	Biostatistics	3		MRS 505	Radiol & Imaging Sci II	3	
MRS 503	Ethics in Radiology	2		MRS 518	Ultrasound Physics	3	
MRS 504	Radiol & Imaging Sciences I	3		MRS 519	Sonogr Cross Sec Anat	3	
MRS 506	Topics in Medical Imaging	3					
<b>TOTAL</b>		<b>11</b>		<b>TOTAL</b>		<b>9</b>	
Semester 3				Semester 4			
Course	Name	Cr.	Pre-req	Course	Name	Cr	PreR
MRS 520	Abdominal Sonography	3		MRS 502	Radiologic Research	3	
MRS 523	Clinical Sonography	3		MRS 509	RIS Seminar	1	
MRS 525	Musc Neon & Ped Sonogr	3		MRS 601	Res/Capst Project	6	
MRS 526	Sonogr Vasc & Postop Imaging	3					
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>10</b>	

## 5.11 Master of Science in Applied Health Research (MAR)

### *Curriculum (Thesis Option)*

#### Credit Hours Required for a Master of Science in Applied Health Research

Type of Courses	Total Credit Hours
Core Courses	12
Subject Courses	11
Elective	1
Thesis	18
<b>Total</b>	<b>42</b>

#### Core Courses (12 credits)

Course No.	Course Name	Cr
MPH 502	Principles of Epidemiology	3
MPH 521	Health informatics	3
REC 502	Biostatistics	3
REC 504	Biomedical Ethics	3
<b>Total</b>		<b>12</b>

#### Subject Courses (11 credits)

Course No.	Course Name	Cr.
MAR 501	Advanced Biostatistics	3
MAR 502	Clinical Trials	3
MAR 503	Clinical Data Management	2
MAR 504	Real Data Analysis	3
<b>Total</b>		<b>11</b>

#### Elective Courses (1 credit)

Course No.	Course Name	Cr.
MAR 505	Qualitative Research Methods	1
MAR 506	Systematic Review & Meta-analysis	1
	Electives from MRM and MPH	1
<b>Total</b>		<b>1</b>
MAR 600	Thesis	<b>18</b>
<b>TOTAL</b>		<b>42</b>

### *Suggested Study Plan*

Semester 1				Semester 2			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-req
MPH 502	Principles Epidem	3	-	MAR 501	Advanced Biostatistics	3	REC 502
MPH 521	Health informatics	3	-	MAR 502	Clinical Trials	3	REC 502
REC 502	Biostatistics	3	-	MAR 503	Clinical Data Management	2	REC 502
REC 504	Biomedical Ethics	3	-	MAR 504	Real Data Analysis	3	REC 502
				MAR 505	Qualitative Res Methods	1	REC 502
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course #	Course Name	Cr	Pre-req	Course #	Course Name	Cr	Pre-req
MAR 600A	Thesis	9		MAR 600B	Thesis	9	MAR 600A
<b>TOTAL</b>		<b>9</b>		<b>TOTAL</b>		<b>9</b>	

## Curriculum (Courses-Only Option)

### Credit Hours Required for a Master of Science in Applied Health Research

Type of Courses	Total Credit Hours
Core Courses	12
Subject Courses	11
Electives	13
Project	6
<b>Total</b>	<b>42</b>

#### Core Courses (12 credits)

Course No.	Course Name	Cr
REC 502	Biostatistics	3
MPH 502	Principles of Epidemiology	3
MPH 521	Health informatics	3
REC 504	Biomedical Ethics	3
<b>Total</b>		<b>12</b>

#### Subject Courses (11 credits)

Course No.	Course Name	Cr.
MAR 501	Advanced Statistics	3
MAR 502	Clinical Trials	3
MAR 503	Clinical Data Management	2
MAR 504	Real Data Analysis	3
<b>Total</b>		<b>11</b>

#### Elective Courses (13 credits)

Course No.	Course Name	Cr.
MAR 505	Qualitative Research Methods	1
MAR 506	Systematic Review & Meta-analysis	1
	Electives from MRM and MPH	11
<b>Total</b>		<b>13</b>
MAR 601	Project	6
<b>TOTAL</b>		<b>42</b>

## Suggested Study Plan

Semester 1				Semester 2			
Course #	Course Name	Cr.	Pre-req	Course #	Course Name	Cr	Pre-req
MPH 502	Principles of Epidemiology	3	-	MAR 501	Advanced Biostatistics	3	REC 502
MPH 521	Health informatics	3	-	MAR 502	Clinical Trials	3	REC 502
REC 502	Biostatistics	3	-	MAR 503	Clinical Data Management	2	REC 502
REC 504	Biomedical Ethics	3	-	MAR 504	Real Data Analysis	3	REC 502
				MAR 505	Qualitative Res Methods	1	REC 502
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	
Semester 3				Semester 4			
Course #	Course Name	Cr	Pre-req	Course #	Course Name	Cr	Pre-req
	Elective	3		MAR 601	Project	6	REC 502
	Elective	3			Elective	3	
	Elective	3			Elective	3	
	Elective	3					
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>12</b>	



## 5.12 Master of Science in Health Research Management (MRM)

### *Curriculum (Thesis Option)*

#### Credit Hours Required for a Master of Science in Health Research Management

Type of Courses	Total Cr Hours
Core Courses	12
Subject Courses	12
Thesis	18
<b>Total</b>	<b>42</b>

#### Core Courses (12 credits)

Course No.	Course Name	Credits
MPH 502	Principles of Epidemiology	3
MPH 521	Health informatics	3
REC 502	Biostatistics	3
REC 504	Biomedical Ethics	3
<b>Total</b>		<b>12</b>

#### Subject Courses (12 credits)

Course No.	Course Name	Credits
MRM 501	Clinical Research Management Fundamentals	2
MRM 502	Law in Healthcare Delivery; Compliance, legal, & regulatory issues	2
MRM 503	Fundamentals of Device and Drug Development	2
MRM 504	Ethical Conduct and Review Boards	2
MRM 505	Financial Management of Research	2
MRM 506	Leadership and Quality Management in Research	2
<b>Total</b>		<b>12</b>
MRM 600	Thesis	18
<b>TOTAL</b>		<b>42</b>

### *Suggested Study Plan*

Semester 1				Semester 2			
Course #	Course Name	Cr.	PreR	Course #	Course Name	Cr	PreR
MPH 502	Principles of Epidemiology	3	-	MRM 501	Clin Res Managemnt Fund	2	REC 504
MPH 521	Health informatics	3	-	MRM502	Law Healthcare Delivery;	2	REC 504
REC 502	Biostatistics	3	-	MRM503	Fund Dev Drug Dev	2	REC 502
REC 504	Biomedical Ethics	3	-	MRM 504	Ethic Cond Review Boards	2	REC 504
				MRM 505	Financial Manag Research	2	REC 502
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>10</b>	
Semester 3				Semester 4			
Course #	Course Name	Cr	PreR	Course #	Course Name	Cr	PreR
MRM 506	Leader Quality Manag Res	2	REC 504	MRM 600B	Thesis	9	MRM 600A
MRM 600A	Thesis	9					
<b>TOTAL</b>		<b>11</b>		<b>TOTAL</b>		<b>9</b>	

## Curriculum (Courses-only Option)

### Credit Hours Required for a Master of Science in Health Research Management

Type of Courses	Total Cr Hours
Core Courses	12
Subject Courses	12
Electives	12
Project	6
<b>Total</b>	<b>42</b>

#### Core Courses (12 credits)

Course No.	Course Name	Credits
MPH 502	Principles of Epidemiology	3
MPH 521	Health informatics	3
REC 502	Biostatistics	3
REC 504	Biomedical Ethics	3
<b>Total</b>		<b>12</b>

#### Subject Courses (12 credits)

Course No.	Course Name	Credits
MRM 501	Clinical Research Management Fundamentals	2
MRM 502	Law in Healthcare Delivery; Compliance, legal, & regulatory issues	2
MRM 503	Fundamentals of Device and Drug Development	2
MRM 504	Ethical Conduct and Review Boards	2
MRM 505	Financial Management of Research	2
MRM 506	Leadership and Quality Management in Research	2
<b>Total</b>		<b>12</b>

#### Elective Courses (12 credits)

Course No.	Course Name	Credits
MPH 503	Environmental and Occupational Health	3
MPH 522	Global Health	3
MRM 507	J Club/seminar (contemporary issues in research management)	3
	Elective	3
<b>Total</b>		<b>12</b>
MRM 601	<b>Project</b>	<b>6</b>
<b>TOTAL</b>		<b>42</b>

## Suggested Study Plan

Semester 1				Semester 2			
Course #	Course Name	Cr.	PreR	Course #	Course Name	Cr	Pre-req
MPH 502	Principles of Epidemiology	3	-	MRM 501	Clin Res Management Fund	2	REC 504
MPH 521	Health informatics	3	-	MRM502	Law Healthcare Del;	2	REC 504
REC 502	Biostatistics	3	-	MRM503	Fund Device Drug Dev	2	REC 502
REC 504	Biomedical Ethics	3	-	MRM 504	Ethic Conduct Rev Boards	2	REC 504
				MRM 505	Fin Management Res	2	REC 502
<b>TOTAL</b>		<b>12</b>		<b>TOTAL</b>		<b>10</b>	
Semester 3				Semester 4			
Course #	Course Name	Cr	PreR	Course #	Course Name	Cr	Pre-req
	Elective	3		MRM 601	Project	6	REC 502
MRM 506	Leader Quality Manag Res	2	REC 504	MRM 507	J Club/sem	3	
MPH 503	Envir Occupational Health	3	REC 504				
MPH 522	Global Health	3	REC 504				
<b>TOTAL</b>		<b>11</b>		<b>TOTAL</b>		<b>9</b>	