2 Theory = 2 credits	Radiation Biology	RAD 221
المتطلب السابق: **Human Anatomy and Physiology (1)** **HRS 112** **Introduction to Radiation Physics** **RAD 211**	This course covers the interactions of radiation with cells, tissues and the body as a whole. It also covers the resultant biophysical events, the theories and principles of radiosensitivity and response and the biological principles of radiation therapy At the end of the course, the student should be able to: Explain the principles of radiation biology and compare these with the principles of cellular biology. Distinguish between units of radiation quantities and radiobiological measures and demonstrate correct usage. Compare and contrast somatic and genetic effects of radiation. Describe radiolysis of water related to target theory and radiation-induced intracellular chemical reactions. Apply the principles of radiobiology to tumor cell biology and evaluate radiation effects anticipated in the clinical practice of radiation therapy. Explain the relationship of time, dose, fractionation, volume and site and radiation effects. Explain and interpret factors affecting RBE, cell cycle and cell death. Categorize the systemic responses to radiation with respect to varying tolerance of differing organs and systems including hematological system and skin. Describe in detail the 4R's of radiobiology and the concept of LD 50/30.	

2 Theory + 1 practical = 3 credits	Computed Tomography	RAD 222
المتطلب السابق: **Introduction Radiological Modalities** **RAD 212** **Introduction to Radiation Physics** **RAD 211**	This course introduces CT instrumentation and operation, components- the x-ray system, detectors and computer, scanning, image processing and display, scanning parameters and their effects– kVp, mA, time, table speed, beam width and reconstructed slice width, filtrations and their effect, CT image quality - contrast sensitivity, high and low contrast resolution, noise and artifact, basic imaging techniques and principles, radiation safety for patient and operator, image optimization. Summary of the main learning outcomes for students enrolled in the course. - Understanding of evolution of computed tomography - Physical principles and instrumentation involved in computed tomography - Physic topics; the characteristics of x-radiation, CT beam attenuation, linear attenuation coefficients - Tissue characteristics and Hounsfield attenuation numbers application, data acquisition and manipulation, image reconstruction algorithms, such as filtered back-projection and transform - Components of C T scanner; Gantry assembly (patient aperture, rotating frame, x-ray tube, collimator, and detectors), Patient table, Operator console, CT computer and Workstations - Operation of Scan console and Display console to demonstrate various functions.	

2 Theory = 2 credits	Pathology	RAD 223
المتطلب السابق: **Human Anatomy and Physiology (1)** **HRS 112**	The course is designed to provide the students with extensive knowledge about disease processes in relation to etiology, and the pathophysiology disorders that compromise healthy systems, with emphasis on radiographic manifestations, procedural and technical considerations as well as advantages and disadvantages of various imaging modalities Describe the various pathologic conditions affecting each body system including, etiology pathogenesis, .manifestations, complications and prognosis Define basic terms related to pathology. Summarize the process of tissue disruption, repair, and .healing Categorize specific diseases into systemic classifications	

2 Theory + 1 Practical = 3 credits	Introduction to Radiation Physics	RAD 211
المتطلب السابق: **Biology for Health programs** **HFSB 101–1**	This course introduces the structure of atom and radiation – concept, nature nd production. Topics include electromagnetic spectrum, radioactivity and half-life, x-ray production – characteristics and the interaction of radiation with matter, dosimetry, radiation safty Summary of the main learning outcomes for students enrolled in the course. Radiations principles, behaviours, and interactions. The atom structure, binding energy, excitation, ionization and non-ionization and atomic radiation. Radioactivity decay law and half-life. Radiation interaction with matter.	

2 Theory = 2 credits	**Introduction Radiological Modalities**	**RAD 212**
المتطلب السابق: **Biology for Health programs** **HFSB 101–1**	This course is an overview of the diagnostic and therapeutic radiological modalities. Emphasis will be on general operating principles of the modality and its integration into patient diagnosis imaging and radiation therapy. Modalities to be covered are X-ray, CT, MRI, US, Gamma camera, and PET Summary of the main learning outcomes for students enrolled in the course. - Diagnostic and therapeutic radiological modalities within the health care and health industrial framework - Uses purpose of diagnostic imaging and radiation therapy modalities - Impacts assessment of each modality on treatment and diagnosis Managements	

2 Theory + 2 Practical = 4 credits	Basic radiographic Techniques	RDI 221
المتطلب السابق: **Human Anatomy and Physiology (1)** **HRS 112** **Introduction to Radiation Physics** **RAD 211**	Students are presented with all routine radiographic procedures and applicable anatomy of the appendicular skeleton. Laboratory positioning exercises prepare the student for practical application of the procedures in the assigned radiology department in health care agencies. Students will learn the fundamentals of radiographic positioning and principles of radiographic exposure, including examinations of the pelvis and hips, ribs and sternum, spine, digestive system, urinary tract and biliary system, upper and lower limp and the head and pediatric radiography Phantom radiography and role-playing prepare the student for practical application of the procedures Summary of the main learning outcomes for students enrolled in the course. - Experience Patient preperation and positioning - Application of clinical radiographic procedures - Learn exposour parameters and x-ray unit handling - Image criteque - Understand radiation safty principles - Continuous practicing radiography application for enceasing knowledge and experiences	

2 clinical= 2credits☐	**Clinical Practicum (1)**	**RDI 222**
المتطلب السابق: **Human Anatomy and Physiology (1)** **HRS 112** **Introduction to Radiation Physics** **RAD 211**	This course is fully clinical, provides exposure to the clinical environment allowing the student to practice some knowledge of what they have learned from the previous modules and gain clinical experience. The student will begin to apply cognitive, psychomotor, and affective skills in the clinical setting. Students will be allowed to perform basic scanning procedures starting with calling patient, patient history and assessment, patient education, scan preparation, patient positioning, setting up scout view, setting up imaging parameters and will eventually have the opportunity to participate in advanced procedures such as trauma and surgical cases. The student will learn safe practice of radiation, policies and procedure. The students will function under the supervision and guidance of the qualified clinical radiographers and physicians in the health care setting Summary of the main learning outcomes for students enrolled in the course. - Experience from the learning acquired during the previous CT modules - Application of clinical experience in real clinical situation - Experience of CT procedures according to the need of clinical data for the patient under supervision and guidance of qualified radiologic technologist - Continuous practicing CT application for enceasing knowledge and experiences	

2 Theory + 1clinical= 3 credits	**CT Protocols and Techniques**	**RDI 311**
المتطلب السابق: **Clinical Practicum (1)** **RAD 222** **Introduction to Radiation Physics** **RAD 211**	This course introduces indications for the procedure, patient history and assessment, patient education, scan preparation, patient positioning, setting up scout view, setting up imaging parameters including slice thickness, pitch, kVp, mA, exposure time, tube-detector assembly speed of rotation, radiation coverage and identification of cross-sectional anatomy, optimizing the dose required per procedure, principals of applying filters, imaging and archiving, contrast media, functional mechanism of contrast media, indication and contraindication of contrast media, adverse reaction of contrast media and image reconstruction. Cover CT protocols for varies parts of the body. Summary of the main learning outcomes for students enrolled in the course. - CT examinations protocols - Patient history and assessment, indications for procedure - Patient education, scan preparation, preferred orientation and positioning - Contrast media use, selectable scan parameters, scout image, filming and archiving of image - The imaging technique for each organ/ region to match the criteria for diagnostic image and modification of technique in clinical condition that affects image quality - Evaluation of image for any artefact, quality, anatomy and pathology - Assignment to CT facility to provide student with opportunity to observe, assist and perform CT procedures under supervision and guidance of qualified CT specialist.	

2 Theory + ١Practial= 3 credits☐	CT and MRI Cross–sectional Anatomy and Pathology (1)	RDI 312
المتطلب السابق: **Human Anatomy and Physiology (1)** **HRS 112** **Human Anatomy and Physiology (2)** **HRS 113** **Radiation Biology** **RDI 221**	Sectional anatomy of brain with correlation primarily to CT images without I.V. contrast.(1) Sectional anatomy of brain with correlation primarily to CT images with I.V. contrast.(2) Sectional anatomy of brain with correlation primarily to MR images. Comparison of appearance of anatomical structures on T1 and T2 MR weighted images of brain. Correlation of selected images of brain PET and SPECT to CT and MR images Sectional anatomy of head and neck (PNS, petrous bone) with correlation to CT and MR images. Sectional anatomy of head and neck (orbit, sella turcica) with correlation to CT and MR images Sectional anatomy of spine (cervical, dorsal and lumbo-sacral) with correlation primarily to CT and MR images Vascular anatomy of the head and neck and the correlation with CT and MR angiography. Common pathologies found in CT and MRI of the CNS and their appearance with various imaging protocols of CT and MRI Common pathologies found in CT and MRI of the head and neck and their appearance with various imaging protocols of CT and MRI Summary of the main learning outcomes for students enrolled in the course. This course begins with a review of gross anatomy of the human head, neck and central nervous system. It is designed to build the knowledge of sectional anatomy of human brain and central nervous system (CNS) regions from a three dimensional perspective. During this course student will learn the identification of gross anatomical structures in axial (transverse), sagittal, coronal and orthogonal (oblique) planes and the clinical application of this knowledge to imaging modalities of CT and Magnetic Resonance images. Also characteristic appearance of each anatomical structure on post contrast images of CT and MR images will be stressed. Focus will cover the common pathologies found in CT MRI and their appearance with various imaging protocols of CT and MRI	

2 Theory + 1clinical= 3 credits	**Radiation Safety, Dosimetry and Management**	**RDI 313**
المتطلب السابق: **Radiation Biology** **RDI 221**	This course introduces the radiation exposure, radiation absorbed dose, equivalent dose, effective dose, the effect of ionizing radiation on tissue (Stochastic and Deterministic Effects), Deterministic thresholds, overdose, risk versus benefits, dose assessment of patient and operator, typical entrance doses, radiation in different procedures, radiation in different system technologies, dose rate versus technical factors, pregnant and pediatric concerns, staff concerns, ALARA, radiation safety information system, dose and radiation monitoring and dose reduction methods. Summary of the main learning outcomes for students enrolled in the course. - Effect of ionizing radiation on tissue (Stochastic and Deterministic Effects) - Deterministic thresholds, overdose and risk versus benefits - Dose assessment of patient, typical entrance doses from radiation in different procedures, from radiation in different system technologies and dose rate versus technical factors - Dose assessment of pregnant and pediatric patients - Dose assessment of operator and work load ALARA concept, radiation safety information system, dose and radiation monitoring and dose reduction methods.	

2 Theory + 1clinical= 3 credits	**MRI Physics and Technology**	**RDI 314**
المتطلب السابق: **لا يوجد**	Theory of Nuclear Magnetic Resonance Imaging. MR signal generation and its characteristics; T1 & T2. MR Image Formation and the Use of Gradient Field. Slice selection and signal localization methods MR image Parameters and their effects in image quality MRI Instrumentation. Basic MRI sequences (SE & GE) MRI Safety and Hazards - Patient care and patient preparation for MRI exam. Summary of the main learning outcomes for students enrolled in the course. This course let the Students identify the theory and the physical principles of Magnetic Resonance Imaging, the effect of magnetic field on the nuclei and the production of MR signal. In this course the student will be able to understand how MR image is formed and how the images acquired with different orientation. This course also describe various imaging parameters and identify their effect in improving image quality. Finally the course will provide the student with enough knowledge in MRI safety and hazards.	

2 Theory + ١clinical= 3 credits☐	Patient Care and Management in Radiology	RDI 315
المتطلب السابق: **Radiation Biology** **RDI 221**	Introduction: The hospital, the patient and the radiographer. The responsibilities of the radiographer. Features of general patient care, communication and Patient education. Risks and hazards in the Radiology department: Contrast agents, Drugs , Radiation and complicated procedures . Sterilization and sterile techniques Patient's general preparations of the abdomen and clothing. Special preparation of the patient: Infection control, Pregnant patient, Consent form Emergency patient care procedures, patient's vital signs ، Infection control Summary of the main learning outcomes for students enrolled in the course. - The course will provide the students with necessary theoretical knowledge and practical tools which they need to meet their responsibilities towards the patients. This should include some knowledge of the first aid, the patient handling, hygiene in the Radiology department and how to deal with patients according to their situation: (stretcher patient, unconscious patient, and anaesthetized patient). The course gives the students some knowledge about drugs used in Radiology Department. The course introduces the students to different types of patient care procedures and the best ways of creating good and healthy atmosphere for the patients.	

2 Theory + 1clinical= 3 credits	**Interventional Radiology**	**RDI 316**
المتطلب السابق: **Radiation Biology** **RDI 221** **Clinical Practicum (1)** **RDI 222**	This course is the study of interventional radiologic and surgical procedures. Topics to be covered include physics, equipment requirements, technologies, the x-ray system and imaging receptor, image acquisition processing and display, scanning parameters and their effects, filtrations and their effect angiography system versus cardiac-cath-lab system, anatomy visualized, radiographer's role, indications, contraindication, and pre- and post-procedural care, surgical procedures and pathologies demonstrations. Summary of the main learning outcomes for students enrolled in the course. - Understand the physics, equipment, technologies, the x-ray system and imaging receptor, image acquisition processing and display, scanning parameters and their effects, filtrations and their effect - Different between angiography system versus cardiac-cath-lab system - anatomy visualized - Radiographer's role, indications, contraindication, and pre- and post-procedural care, surgical procedures and pathologies demonstrations - Theoretical knowledge and practical skills related to special radiographic examinations that are not undertaken routinely and may require specialized equipment - The difficulties concerning patient care and equipment manipulation during these special procedures and remedial measures to be taken by radiologic technologist The special examinations include, angiography-cerebral, abdominal, peripheral-arteriography and venography; lymphography, myelography, macroradiography, cardiac catheterization and interventional radiography	

2 clinical= 2 credits☐	**Clinical Practicum (2)**	**RDI 321**
المتطلب السابق: **CT Protocols and Techniques** **RDI 311** **MRI Physics and Technology** **RDI 314**	This course is fully clinical, provides exposure to the clinical environment allowing the student to practice some knowledge of what they have learned from the previous modules and gain clinical experience. The student will begin to apply cognitive, psychomotor, and affective skills in the clinical setting. Students will be allowed to perform basic scanning procedures starting with calling patient, patient history and assessment, patient education, scan preparation, patient positioning, setting up scout view, setting up imaging parameters and will eventually have the opportunity to participate in advanced procedures such as trauma and surgical cases. The student will learn safe practice of radiation, policies and procedure. The students will function under the supervision and guidance of the qualified clinical radiographers and physicians in the health care setting Summary of the main learning outcomes for students enrolled in the course. - Experience from the learning acquired during the previous CT modules - Application of clinical experience in real clinical situation - Experience of CT procedures according to the need of clinical data for the patient under supervision and guidance of qualified radiologic technologist - Continuous practicing CT application for enceasing knowledge and experiences	

1 Theory + 1 clinical= 2 credits	Advanced CT Procedures	RDI 322
المتطلب السابق: **CT Protocols and Techniques** **RDI 311**	This course is a continuation for the previous course (CT protocols and technology). The course is designed to introduces more advanced CT applications. Diifferent functional and dynamic CT techniques and its applications, optimize image quality in some of the advance techniques and how to setup the exam and patient in those procedures. Advanced procedures in CT like: 3D reconstruction, CTAs, biopsies, drains, post-myelography, Radiation Therapy planning and 4D imaging, CT arthrography, PET/CT, SPECT/CT, and virtual colonoscopy will be presented. Procedure indications and contraindications, patient and room preparation, positioning techniques, contrast media usage, and scan parameters for each will be included, along with basic protocol information and how to tailor procedures to the patient's indications Summary of the main learning outcomes for students enrolled in the course. - The advanced techniques in CT. - Advanced Computed Tomography procedures and its clinical applications - Different functional and dynamic CT techniques and its applications - Optimize image quality in some of the advance techniques and how to setup the exam and patient in those procedures - Advanced procedures in CT like: 3D reconstruction, CTAs, biopsies, drains, post-myelography, Radiation Therapy planning and 4D imaging, CT arthrography, PET/CT, SPECT/CT, and virtual colonoscopy will be presented Procedure indications and contraindications, patient and room preparation, positioning techniques, contrast media usage, and scan parameters for each will be included, along with basic protocol information and how to tailor procedures to the patient's indications.	

2 Theory + 1 Practical= 3 credits	**CT and MRI Cross–sectional Anatomy and Pathology (2)**	**RDI 323**
المتطلب السابق: **CT and MRI Cross–sectional Anatomy and Pathology (1)** **RDI 312**	This course is a continuation for the previous course (CT protocols and technology). The course is designed to introduces more advanced CT applications. Diifferent functional and dynamic CT techniques and its applications, optimize image quality in some of the advance techniques and how to setup the exam and patient in those procedures. Advanced procedures in CT like: 3D reconstruction, CTAs, biopsies, drains, post-myelography, Radiation Therapy planning and 4D imaging, CT arthrography, PET/CT, SPECT/CT, and virtual colonoscopy will be presented. Procedure indications and contraindications, patient and room preparation, positioning techniques, contrast media usage, and scan parameters for each will be included, along with basic protocol information and how to tailor procedures to the patient's indications Summary of the main learning outcomes for students enrolled in the course. - The advanced techniques in CT. - Advanced Computed Tomography procedures and its clinical applications - Different functional and dynamic CT techniques and its applications - Optimize image quality in some of the advance techniques and how to setup the exam and patient in those procedures - Advanced procedures in CT like: 3D reconstruction, CTAs, biopsies, drains, post-myelography, Radiation Therapy planning and 4D imaging, CT arthrography, PET/CT, SPECT/CT, and virtual colonoscopy will be presented Procedure indications and contraindications, patient and room preparation, positioning techniques, contrast media usage, and scan parameters for each will be included, along with basic protocol information and how to tailor procedures to the patient's indications.	

2 Theory + 1 Practical= 3 credits	Women's Imaging Techniques	RDI 324
المتطلب السابق: **Introduction to Radiological Modalities** **RAD 212** **CT Protocols and Techniques** **RDI 311** **MRI Physics and Technology** **RDI 314**	Women's imaging is a dedicated course in the program for women's imaging techniques. Students in this course gain knowledge in various diagnostic techniques and modalities related to women's health. Students who successfully complete this course will be able to satisfactorily perform different scanning techniques and employ the new technology in the successful diagnosis of women's diseases. Effective communication with patients and staff and safe practice are emphasized through all clinical courses in this program. Summary of the main learning outcomes for students enrolled in the course. To develop in students the basic working knowledge of women imaging techniques within the health care and health industrial framework. The course will open for the students ways for modern diagnostic techniques in women imaging, Review standard imaging of the breast including mammography, ultrasound, MRI and nuclear imaging.	

2 Theory + 1 Practical= 3 credits	MRI Sequences and Techniques	RDI 325
المتطلب السابق: **Introduction to Radiological Modalities** **RAD 212** **Introduction to Radiation Physics** **RAD 211**	MRI Pulse Sequences Part One: Spine Echo, FSE, MFSE, inversion recovery, STIR, FLAIR MRI Pulse Sequence Part Two: Gradient Echo, FLASH, SPOLIED, STFP Saturation Techniques and applications MR Angiography Techniques Introduction to FMRI and MRS Fast Imaging Techniques and its Applications. MR Imaging Artefacts and their Compensation MRI Clinical Procedures in neuro Imaging MRI Clinical Procedures in MSK and body imaging. Summary of the main learning outcomes for students enrolled in the course. - This course is continuation of MRI materials given in this program. The course will introduce deferent Magnetic Resonance Imaging pulse sequences and its clinical applications. - The course describe different tissue contrast on different weighting. The course will also describe various imaging techniques and identify main imaging artefacts and how to avoid them.	

2 Theory = 2 credits	**Research Methods & Research Project (1)**	**RDI 411**
المتطلب السابق: **Biostatistics** **HRS 116**	To provide students with the tools and skills required to understand research terminology and assess published research. To identify the types of methods best suited for investigating different types of problems and questions. To develop research questions that are based on and build upon a critical appraisal of existing research. To design a research proposal; and To begin initial preparations for embarking on a new research project. Summary of the main learning outcomes for students enrolled in the course. - This course is designed to aid in the development of inquiry and research skills. The intent of the course is to elevate understanding of the problems and issues affecting the profession and to encourage personal involvement, greater participation and contribution as professionals in the future directions of the radiologic sciences. This course is designed to provide the student with knowledge of research methodology. Students are required to use their literature review to produce a publishable manuscript.	

1 Theory + 2 Clinical = 3 credits	**Clinical Practicum (3)**	**RDI 412**
المتطلب السابق: **Clinical Practicum (2)** **RDI 321**	Practical course for MRI techniques courses. Summary of the main learning outcomes for students enrolled in the course. In this course the experience acquired during, advanced Procedures courses will be applied in real clinical situation. During the course Student will be assigned to the MRI unit in the hospital. Student will attend, observe and share the experience of advanced MRI techniques according to the need of clinical data for the patient under supervision and guidance of qualified radiologic technologist.	

2 Theory + 1 Clinical = 3 credits	Quality Assurance in Diagnostic Radiology (1)	RDI 413
المتطلب السابق: **Basic radiographic Techniques** **RDI 221** **Computed Tomography** **RAD 222**	This course introduces the medical imaging parameters and associated image quality and dose, dose reduction techniques and scatter concept and minimization, filtration, HVL, heel effect, grid, collimation, FSS, the concept of digital and analog imaging, the principles and importance of implementation the QA/QC programs in and on radiology department and diagnostic equipment respectively, roles of medical physicist, technologist and radiologist, image quality verification and dosimetry will be introduced. The students will be introduced to the basic testing procedures in accordance to international bodies such as American College of Radiology (ACR), Food and Drugs Association (FDA), American Association of Physicist in Medicine (AAPM). Summary of the main learning outcomes for students enrolled in the course. - Importance of implementation the QA/QC programs in and on diagnostic department and equipment respectively - Image parameters and associated image quality and dose - Image quality characteristics, contrast and spatial resolutions, noise - Roles of medical physicist, technologist and radiologist in optimizing dose and image quality - Basic physics testing procedures for image quality and dose levels in accordance to international bodies such as American College of Radiology (ACR), Food and Drugs Association (FDA), American Association of Physicist in Medicine (AAPM). - Image quality evaluation and optimization Dose evaluation and optimization	

2 Theory + 1 Clinical = 3 credits	Advanced MRI Procedures	RDI 414
المتطلب السابق: **MRI Sequences and Techniques** **RDI 325**	K-space implementation in advanced pulse sequences and fast imaging. MRI Diffusion Imaging and its application. MR Diffusion Tensor Imaging. MR Perfusion Imaging and its application. MR Spectroscopy and its application Advanced techniques in MR angiography MRI functional imaging. Magnetic Resonance cholangiopancreatography (MRCP(MR Enteroclysis technique MR relaxometry mapping and its applications . Dynamic MRI techniques and its application Fat quantification techniques using MRI High field MRI and its advantage and disadvantage. - New technology in MRI and implementation of parallel imaging Summary of the main learning outcomes for students enrolled in the course. - This course is designed to provide the students with knowledge needed to master the advanced techniques in MRI. The course will introduce advanced Magnetic Resonance Imaging sequences and its clinical applications. - The course describe different functional and dynamic MRI techniques and its applications. - The course will also describe how to optimize image quality in some of the advance techniques and how to setup the exam and patient in those procedures. The course will open for the students the future of MRI technology.	

2 Theory + 1 Clinical = 3 credits	Image Processing and 3D Lab Techniques	RDI 415
المتطلب السابق: **MRI Sequences and Techniques** **RDI 325**	Fundamental concepts of low and high level image processing algorithms used in medical image analysis (such as those that occur in MRI, CT, PET or SPECT imaging). A basic review of image acquisition, through low level processing to high level object extraction and recognition: Image enhancement, restoration, filtering, segmentation, morphology, texture, presentation & description, compression, recognition & interpretation, and registration. These topics will be - Demonstrated throughout the course. Summary of the main learning outcomes for students enrolled in the course. The objective of this course is to provide students with an overview of the computational and mathematical methods in medical image processing. The course covers the main sources of medical imaging data (CT, MRI, PET, and ultrasound). We will study many of the current methods used to enhance and extract useful information from medical images. A variety of radiological diagnostic scenarios will be used as examples to motivate the methods.	

2 Theory + 1 Clinical = 3 credits	Image interpretation	RDI 416
المتطلب السابق: **CT and MRI Cross–sectional Anatomy and Pathology (1)** **RDI 312** **CT and MRI Cross–sectional Anatomy and Pathology (2)** **RDI 323**	Interpretation of diagnostic imaging examinations is a key skill for many healthcare practitioners and has a significant impact on service delivery. This course will provide the student with image interpretation skills and knowledge of the radiological and clinical indicators which are utilised to identify pathology of the axial skeleton and abdomen. The unit aims at enabling the practitioner to achieve a level of competency sufficient to .participate The course is designed to cover normal anatomy and normal variants common fractures, including their prevalence and mechanism of injury subtle injuries that are often missed radiologically but which are clinically significant soft tissue signs in the absence of obvious bony injury fracture classification including common eponyms risk factors, including potential pathological conditions, which may either predispose to the injury or be an incidental finding other associated injuries following initial diagnosis radiographic projections to aid the non-radiographer in diagnosis Image Interpretation, also known as Interpretation of Radiological Images, its objective to give radiographers students and other health professionals with interpreting and offering reports on plain x-rays (adult and paediatric - appendicular and axial skeleton; abdomen and chest); cross-sectional imaging (CT and MRI); ultrasound (gynaecological, abdominal, men's health, vascular, musculoskeletal and head and neck) and breast imaging (multi-modality); with additional modules relating to forensic radiography and an introduction to imaging technologies.	

2 Theory + 1clinical= 3 credits	Cardiac Imaging, CT/MRI	RDI 421
المتطلب السابق: **CT Protocols and Techniques** **RDI 311** **MRI Physics and Technology** **RDI 314**	Cardiac anatomy and imaging planes. Cardiac anomalies. Principles of Cardiac CT, Optimal imaging: practical physics and imaging protocols. MR Cardiac pulse sequences and tissue contrast Anatomical and functional imaging Perfusion imaging (first pass and delayed enhancement.(Measuring wall motion with tagging methods Imaging blood flow Cardiac MRI: clinical perspective . Patient care, setup and management in cardiac imaging Summary of the main learning outcomes for students enrolled in the course. This course provides students with principles of cardiac CT/MRI with its implementation in a clinical environment and the correlation with cardiac anatomy. Theory covered includes CT protocols for cardiac imaging considerations dose optimization and patient setup. optimized cardiac MRI pulse sequence design, patient set up and anatomical imaging planes, anatomical and functional imaging, and clinical applications. The course provides students with an understanding of the theoretical background of cardiac imaging and its use in clinical practice.	

2 Theory = 2 credits☐	**Research Methods & Research Project (2)**	**RDI 422**
المتطلب السابق: **Research Methods & Research Project (1)** **RDI 411**	This a Graduation project research course in which the student will select a topic related to his area of interest to perform a research by applying the methodology and knowledge acquired throughout the entire program. Summary of the main learning outcomes for students enrolled in the course. In this course the student will apply the knowledge acquired in the previous course (Research Methodology & Design) to design and prepare his research project. The research project selected by the student should be in one of the following areas CT, MRI, Image Processing, Women Imaging	

2 Clinical = 2 credits☐	**Clinical Practicum (4)**	**RDI 423**
المتطلب السابق: **Clinical Practicum (2)** **RDI 321** **Clinical Practicum (3)** **RDI 412**	Practical course for intervantional radiography Summary of the main learning outcomes for students enrolled in the course. a) provide practical experience on what was learned in previous modules of interventional radiology b) Develop understanding on the advanced system operation c)Does optimization d) Break the fear	

1 Theory + 1Clinical = 2 credits	Quality Assurance in Diagnostic Radiology (2)	RDI 424
المتطلب السابق: **Quality Assurance in Diagnostic Radiology (1)** **RDI 413**	This course is fully clinical, provides the students with clinical experience. The student will gain practical experience and begin to apply cognitive, psychomotor, and affective skills in the clinical setting. The students will function under the supervision and guidance of the qualified medical physicist Summary of the main learning outcomes for students enrolled in the course. In this course the knowledge acquired during, Quality Assurance in Diagnostic Radiology I will be applied in real clinical situation. During the course Student will be assigned to observe and perform work in radiology department	

2 Theory + 1 Practical= 3 credits	**Medical Imaging Informatics and PACS**	**RDI 425**
المتطلب السابق: **Image Processing and 3D Lab Techniques** **RDI 415**	This course describe the basic knowledge of medical informatics within the health care and radiology department framework. The course will introduce the basics of computer terminology and information technology in medical industry and describe the institutional information systems. The course will introduce the technology used in radiological digital imaging and archiving systems (PACS) and its components Summary of the main learning outcomes for students enrolled in the course. To develop in students the basic working knowledge of medical informatics within the health care and radiology department framework. The course will introduce the student to basics of computer terminology and information technology in medical industry. The course will describe the institutional information systems. The course will introduce the technology used in radiological digital imaging and archiving systems (PACS) and its components.	

2 Theory + 1 practical = 3 credits	**Human Anatomy and Physiology (2)**	**HRS 113**
المتطلب السابق: **Human Anatomy and Physiology (1)** **HRS 112**	By the end of the course, the student will be expected to be able identifiy and understand the followinh Respiratory system Digestive System Endocrine System Cardiovascular system Body Fluid & Blood Urinary system Reproductive System Lymphatic and immunity system Integumentary system Nervous system	

2 Theory + 1 practical = 3 credits	Emergency life support techniques	HRS 114
المتطلب السابق: **Human Biology** **HFSB 101–1** **Biology for Health programs** **HFSB 102–1**	The course is a 3 unit course of lectures and laboratory which develops the students knowledge on the basic concepts first aid and cardiorispiratory resuscitation. The student will also be learning how to assess emergency situations such as bleeding, fractures , wounds and shock. The student will also be learning how to prevent disease transmition, and isolation concepts. To realize the general concepts and the basis of first aid and perform CPR effectively To deal with and manage common first aid emergencies. To deal with and manage common first aid emergencies. To assess the emergency situation and categorize the patients according to the periorities and degree of illness To communicate with the operator , colleagues and patients relatives effectively based on professional ethics and control protocols	

3 Theory = 3 credits	**Society and Health**	**HRS 115**
المتطلب السابق: لايوجد	This course deals with various determinants of health, recent trends in population health, biological, social, political, ethical and psychological dimensions of health and illness as well as health status differences among different communities or cultures. This course also deals with the causal model of the determinants of disease, health function and well being − Recognize how the community affects health − List various determinants of health − Explain recent trends in population health − Compare biological, social, political, ethical and psychological dimensions of health and illness − Explain health status differences among different communities or cultures Illustrate causal model of the determinants of disease, health function and well being	

2 Theory + 1 practical = 3 credits	Biostatistics	HRS 116
المتطلب السابق: **Human Biology** **HFSB 101–1**	After the introductory course "Introduction to biostatistics".The goal of this course is to learn advanced techniques in data analysis for quantitative and cathegorical variables. In this course, students will perform inference about means, correlation, regression and inference about proportion, using hand calculations and computational support (SPSS) Multiple linear regression Students will learn inference about mean Inference about a proportion Comparing independent means Comparing two proportions Comparing several means –ANOVA- Cross tabulated counts Correlation Stratified 2 by 2 tables Regression Multiple linear regression	

2 Theory + 1 practical = 2 credits	Health administration and informatics	HRS 117
المتطلب السابق: لا يوجد	This course provides the students with basic knowledge and skills pertaining to the current issues in Health administration and informatics. Topics include healthcare, health organizations, management, planning, organizing, leadership, controlling and improving performance, making decisions and solving problems, management information systems as well as improving services with informatics tools − Define management, leadership, planning and health information − List various health systems prototypes − Recognize reasons, structures and processes of groups and teams − Recognize leadership theories, traits, skills and behaviors − Recognize record linkage and data protection − Differentiating management and leadership − Compare methods for making decisions − Discuss barriers to effective decision making − Assess quality of health information Coordinate jobs and positions in a healthcare organization	

2 Theory + 1 Practical = 3 credits	**Human Anatomy and Physiology (1)**	**HRS 112**
المتطلب السابق: **Biology for Health programs** **HFSB 101–1** **Human Biology for Health programs** **HFSB 102–1**	Summary of the main learning outcomes for students enrolled in the course. Identify the location of anatomical structures using directional and orientation terms. Describe and identify the anatomical parts of skeletal system and joints on radiographs. Demonstrate the use of topographical landmarks to locate internal structures Acquire knowledge of the functions of the skeletal, joint and muscle systems . Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field) Regularly solicits feedback from students. Describe the structure and function of a human cell. Discuss tissue types and describe the functions of each type. Define radiographic anatomical terminologies. Describe the anatomic position. Classification of bones according to shape . Describe the basic anatomical structure of bone, bone development and growth.	