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 232
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 + 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.	

2 Theory + 1 clinical = 3 credits	**Nuclear Medicine Physics (1)**	**RNM 221**
المتطلب السابق: **Introduction to Radiation Physics** **RAD 211**	This course is based on the theoretical and practical topics that have been given to Nuclear Medicine Technologist as a study material in preparation to set the professional certification exam such as NMTCB and AART It discribes radiation physics in Nuclear Medicine field, principles and characteristics of: Gamma Camera, instruments in NM, Dose calibrator and techniques of radiation detection It also focus on gamma camera components and the factors affecting image quality Explain Atomic structure, radioactive decay and interaction of radiation with matter • Understand the principles of radiation physics in Nuclear Medicine field • Understand of operating principles and characteristics of: Gamma Camera, instruments in NM, Dose calibrator • Apply Various techniques of radiation detection • Understand of the gamma camera components and the factors affecting image quality	

2 Theory + 1 clinical = 3 credits	Radiopharmacy and Radiochemistry	RNM 222
المتطلب السابق: **Chemistry for Health Programs** **HFSC 101-1**	**Radiopharmacy/Radiochemistry will cover the following topics:** • Definition of radiopharmaceutical • Half-life of a radionuclide and main decay schemes • Modes of radionuclide's production • Principles on radionuclide generators • Technetium generator • Chemistry of technetium • Sodium pertechnetate • Radiopharmaceuticals for clinical applications in: • skeleton, cardiovascular, nervous, infection, urinary, pulmonary systems • Colloidal radiopharmaceuticals • Radiopharmaceuticals with tumoral affinity • Radiopharmaceuticals based on monoclonal antibodies • Principles of RIA and IRMA, standard curves and quality controls • Concept of Specific Activity • Chelating agents and stability with different radionuclides • General principles of labeling reactions and quality controls of radiopharmaceuticals •)PET & Therapy(• Calibration of laboratory instruments • Principles of radiation protection during preparation of radiopharmaceuticals • Methods to reduce the radiation exposure • Pharmaceutical aspects (sterility, pyrogenicity) of a radiopharmaceutical • Biodistribution and pharmacokinetics • Dosimetric aspects • Examples and clinical applications of radiopharmaceuticals for therapy	

2 Theory + 1 clinical + 1 Practical = 4 credits	**Nuclear Medicine Clinical Procedures (1)**	**RNM 311**
المقرر السابق : **Nuclear Medicine Physics (1** **RNM 221**	SKELETAL SCINTIGRAPHY • PULMONARY SCINTIGRAPHY • RENAL SCINTIGRAPHY • ENDOCRINE SCAN (THYROID(• ENDOCRINE SCAN (PARATHYROID(• MYOCARDIAL SCNTIGRAPHY • SPECT/PET BASICS PRINCIPLES • GASTRIC SCINTIGRAPHY • BRAIN SCINTIGRAPHY • NON-IMAGING PROCEDURES Understand the thiory behind the clinnical procedures in nuclear mediccine. Learn the steps and requirement for the common procedure in nuclear medicine. The application of math and physics in the nuclear medicine procedures	

2 Theory + 1 clinical = 3 credits	**Nuclear Medicine Physics (2)**	**RNM 312**
المقرر السابق : **Nuclear Medicine Physics (1** **RNM 221**	This course aims to teach students the basics of SPECT, SPECT/CT, PET and PET/CT. This includes operating the systems, understanding imaging parameters and the different hardware modalities available. It also aims towards teaching the students the basic imaging reconstruction methods such as filter-back projection and terative reconstruction algorithms. The course also intraduces SPECT filters , attenuation correction methods and the different artifacts and artifact correction methods. • Understanding of operating principles and characteristics of: SPECT, SPECT/CT, PET, PET/CT • Understand the basic principles of filtering and how to select the correct filter for SPECT imaging • Understand sources of image artifacts and understand the basic concepts attenuation correction • Understand the basic concepts of image reconstruction	

2 Theory + 1 Practical = 3 credits	**Nuclear Medicine Physics** (2)	**RNM 313**
المقرر السابق : لا يوجد	Sectional anatomy of brain - Sectional anatomy of brain with correlation primarily to CT images - Sectional anatomy of brain with correlation primarily to MR images. Sectional anatomy of brain with correlation primarily to Gamma camera images - Comparison of appearance of anatomical structures - 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 Image and gamma camera images. - Sectional anatomy of head and neck (orbit, sella turcica) with correlation to CT and MR Images and gamma camera images - Sectional anatomy of spine (cervical, dorsal and lumbo-sacral) with correlation primarily to CT and MR images and gamma camera images - Vascular anatomy of the head and neck and the correlation with CT and MR angiography and gamma camera images - Common pathologies found in CT and MRI of the CNS and head and neck and their appearance with various imaging protocols - 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 + 1 clinical = 3 credits	Pharmacy and in Vivo Procedures	RNM 314
المقرر السابق : لا يوجد	**Pharmacy and in-vivo procedures will cover the following topics:** Microbiology in Pharmacy Sterilization, Sterility testing and endotoxin determination Particulate contamination The role of excipients in parenteral radiopharmaceutical preparations In)Stability of Radiopharmaceuticals) Stability and shelf-life of (radio)pharmaceuticals Principles in medicinal chemistry Aseptic preparation Pharmacopeia European directives GMP Practical implications for hospitals GMP of Classical Radiopharmaceuticals Registration of medicinal products and General rules for distribution :(Non-Selective(In-Vitro Blood Cells & Vascular System Radiolabelling approaches RBC Mass Volume RBC Survival GI Bleeding Spleen Imaging, Denature RBC Cardiovascular Infection and Inflammation White Cell Labelling :Selective(In-Vivo)Spc.Ligands & Antibodies (LeucoScan, _ GranuloScint Schilling Test Understand Pharmacy part related to Radiopharmacy Understand Pharmacopeia and European directives for GMP Learn Sterility methods in Radiopharmacy applications Learn Cells labeling and In-Vivo/In-Vitro Procedures	

2 Theory + 1 Practical = 3 credits	**Patient Care and Management in Nuclear Medicine**	**RNM 315**
المقرر السابق : لا يوجد	This course aims to teach students the structure of health care system and Bill of rights It also intraduce them to the purpose, importance, and contents of medical records. The course also showes the role of technologist among others in infection control, prevention, and the procedures for cleaning and patients safety, positioning and transferring techniques It intraduces the student to age specific competencies including care of the paediatric, adolescent, and geriatric patients during imaging. It also teach them the normal changes related to aging and their implications for the technologist It helps students understand vital signs and how to measure it, catheterization and urinary care. and any abnormalities in vital signs and the appropriate action needed. It also train students on common emergency complications including its symptoms and action needed. Understand the concept of universal precautions and OSHA regulations regarding infection exposure control Understand patient's privacy, confidentiality concept and regulations Understand basics of EKG's Understand basics of cardiac life support Understand hospital procedures and policy for cardiac arrest, fire and security Understand basics of pharmacology and common interventional drugs .used in Nuclear Medicine Understand and master venepuncture Understand and master patient's communication skills	

1 Theory + 1 Practical = 2 credits	Nuclear Medicine Instrumentation	RNM 321
المقرر السابق : **Nuclear Medicine Physics (1)** **RNM 221** **Nuclear Medicine Physics (2)** **RNM 312**	Introduction to Radiation Detection The components of the Gamma Camera Optimum Imaging Criteria for Plainer & Dynamic scans Bone Density Imaging and Calculations Optimum Imaging Criteria for SPECT scans Dose Calibrator & Counters Functions Fume hoods & Sterile rooms Radiation Survey Meters and units QC Instruments and Sources Documentation & Registration Understand the concept and equipment used in Nuclear medicnce imaging Learn how to operate most of the equipment used in nuclear medicine Understand the units used in in nuclear medicine and their representation in the daily practice. Understand the basic maintenance concepts and the issues concerns the clinical engineering. .Document every important information for the proper period . Understand the polices and needed documentations in nuclear medicine.	

2 Theory + 1 Practical + 1 clinical = 4 credits	Nuclear Medicine Clinical Procedures (2)	RNM 322
المقرر السابق : **Nuclear Medicine Clinical Procedures (1)** **RNM 311**	Inflammatory/Tumour Imaging Haematopoiesis Scan Processing and Images display SPECT imaging and its applications Radiation Protection In Nuclear Medicine Understand the theory behind miscellaneous imaging procedures Learn the criteria for SPECT imaging and indications of use Understand the principles of radiation protection in nuclear medicine daily practice.	

2 Theory + 2 clinical = 4 credits	Radiotherapeutic Procedures in NM	RNM 323
المقرر السابق : لا يوجد	Radiotherapeutic Procedures in NM will cover the following: Therapeutically effective radionuclide Nuclide chelators and linkers Selecting a biological vehicle I-131 for Hyperthyroidism I-131 for PTC MIBG Therapy receptoraffin peptide Radionuclide, complexing ((somatostatin analogue Lu-177 DOTA-Tate labeling and application Y-90 DOTA-Tate Labeling and application : Mnoclonal antibody Ligand, metallic Zevallin Therapy Pretargeted RIT for High Grade Glioma Pretargeted RIT for Breast Cancer :Liposomes, microspheres, etc TheraSphere & SiraSphere Therapy Locoregional Therapy small molecule 67Cu, 90Y, 186Re-, 188Re, (153SM,131I, 211At (osteotropic substances :New Generation Therapy using Re-188 Endovascular Brachy Therapy Skin Cancer Therapy SCT Radionuclides Alpha Therapy Research and clinical trials Radiation Protection in Theraputic Procedures Understand selection criteria of Radiopharmaceuticals for Therapeutics Procedures Learn the biodistribution mechanism of Radiopharmaceuticals Understand the concept of chemical reactions, chelators, PH, sterility and stability Learn Radiopharmacy applications in Therapeutics NM procedures Learn Radiation Safety precautions in Radionuclide Therapy	

2 Theory + 1 Practical = 3 credits	**Computer Applications and Image processing**	**RNM 324**
المقرر السابق : **لا يوجد**	This course teaches the basic components of a personal computer first along with the fundamentals of a digital imaging system and the signal digitization process. It also covers the basic methods of digital image processing that are widely used in processing and quantification of images in nuclear medicine. The student will accentuate the understanding of the theory through the lab works where they will have the opportunity to process, analyze quantitate the real-world images To provide an understanding of the components of personal computers To provide an understanding of digital imaging system contrasted with analog system To provide the fundamental methods of image processing that technologists use in their daily clinical practice To help students develop their communication and collaboration skills through class presentations and group projects	

2 Theory = 2 credits	**Research Methods & Research Project (1)**	**RNM 411**
المقرر السابق : **Biostatistics** **HRS 116**	The course inculses lectures and practical exercises on reseach methodologies. It covers the following topics: • Research definition, concepts and types : qualitative and quantitative; • Definition of terms: methods, techniques, domain, literature review; • Methods of research; • Research design: Qualitative and quantitative research; • Hypothesis formulation and testing, sampling, measurement and variability; • Statistical tools, data evaluation; • Writing a research proposal; Research ethics • Gain the basic knowledge on the concepts and techniques for conducting research. • Examine trends and patterns in using different research methods. • Gain knowledge and appreciation on research writing.	

1 Theory + 2 Clinical = 3 credits	Clinical Practicum Diagnostic (1)	RNM 412
المقرر السابق : **Nuclear Medicine Clinical Procedures (1)** **RNM 311** **Nuclear Medicine Clinical Procedures (2)** **RNM 322**	**Radiopharmacy/Radiochemistry will cover the following topics:** skeletal scintigraphy pulmonary scintigraphy renal scintigraphy (endocrine scan (thyroid (endocrine scan (parathyroid myocardial scntigraphy spect/pet basics principles gastric scintigraphy brain scintigraphy non-imaging procedures Demonstrate an understanding of clinical applications of Nuclear Medicine Demonstrate an understanding of Radiation protection principles in Nuclear Medicine The course is designed to provide students with the principle of SPECT & PET as well as provide a review of many investigations such as bone, liver, spleen, gall - bladder, lung, brain, cardiac and kidney scans Demonstrate an understanding of patient care and patient preparation	

2Theory + 2 Clinical = 4 credits	**Nuclear Medicine Clinical Procedures (3)**	**RNM 413**
المقرر السابق : **Radiotherapeutic Procedures in NM** **RNM 323**	The course inculds lectures and practical exercises to cover the principles of tumor imaging using FDG PET/CT and positron emitters other than FDG such as gallium, sestamibi and labelled monoclonal antibodies and MIBG imaging It also explains the principles of peptide receptor imaging. And lymphoscintigraphy particularly when it is related to breast cancer and melanoma. The course focus on thyroid cancer imaging specifically on the role of Nuclear Medicine • Understand the principles of tumour imaging using FDG PET/CT • Understand the principles of tumour imaging using positron emitters other than FDG • Understand the principles of thyroid cancer imaging focusing on the role of Nuclear Medicine Understand the principles of lymphoscintigraphy particularly when it is related to breast cancer and melanoma.	

2Theory + 1 Clinical = 4 credits	**Radiation Safety & Dosimetry for NMT**	**RNM 414**
المقرر السابق : **Nuclear Medicine Physics (1)** **RNM 221** **Nuclear Medicine Physics (2)** **RNM 312** **Nuclear Medicine Instrumentation** **RNM 321**	The students gain the basic knowledge on radiation and radioactivity, biological effects of radiation, radiation dosimetry and principles and practices in radiation safety in nuclear medicine Develop understanding on radiation protection standards and practices Gain the basic knowledge on radiation and radioactivity • Understand the biological effects of radiation • Understand radiation dosimetry and principles and practices in radiation safety in nuclear medicine • Understand the concepts radiation protection standards and practices	

2Theory = 2 credits	**Image interpretation**	**RNM 415**
المقرر السابق : **لا يوجد**	At the end of the course, students should be able to the unit will provide the student with image interpretation skills and knowledge of the radiological and clinical indicators which are utilized to identify all normal and abnormal radiotracer distribution of all nuclear medicine and PET procedures. The unit aims at enabling the practitioner to achieve a level of competency sufficient skills. • The student should learn how to recognize the normal physiological distribution for each radiotracer, to be able to detect any abnormality in the scan. • The student should be able to recognize any abnormal rediotracer distribution. • The student should know the cause of the abnormal radiotracer distribution. • The student should be able to corerect or overcome the cause of the abnormality according to its cause with different techniques(Image artifact) At the end of the course, students should be able to: his unit will provide the student with image interpretation skills and knowledge of the radiological and clinical indicators which are utilized to identify pathology of the skeleton and abdomen. The unit aims at enabling the practitioner to achieve a level of competency sufficient skills.	

1Theory + 1 Practical = 2 credits	**Nuclear Medicine Quality Control**	**RNM 421**
المقرر السابق : **Nuclear Medicine Physics (1)** **RNM 221** **Nuclear Medicine Physics (2)** **RNM 312**	This course will cover the following subjects: 1. Quality Control and Quality Assurance 2. Basic specifications parameters of the gamma camera 3. Basic specifications parameters of the PET scanner 4. Calibration procedures of the gamma camera and the PET scanner 5. Essential quality control procedures of the gamma camera and SPECT 6. Essential quality control procedures of the PET scanner 7. SPECT/CT and PET/CT tests 8. Quality control procedures of the dose calibrator The main objectives of this course are: 1- To have knowledge about the Quality Control/Assurance procedures of the Gamma Camera, PET Scanner and Dose Calibrator 2- To know how to compare the performance of the said systems 3- To know how to perform the Quality Control tests for these systems To deffrentiate between the Calibration and Quality Control tests	

2 Theory = 2 credits	**Research Methods & Research Project (2)**	**RNM 422**
المقرر السابق : لا يوجد	The course includes lectures and practical exercises on reseach design and conduct and writing of research project with a submission of the fianl research report. It covers the following topics: • Research design • Research proposal: submission and approval • Conduct of research • Evaluation of research projects Research writing • Gain the basic knowledge on writing a research design. • Write and submit a research proposal. • Conduct a specific research project.	

1 Theory + 2 Clinical = 3 credits	Clinical Practicum–NM (2)	RNM 423
المقرر السابق : **Clinical Practicum Diagnostic (1)** **RNM 412**	Therapeutically effective radionuclide Nuclide chelators and linkers Selecting a biological vehicle I-131 for Hyperthyroidism I-131 for PTC MIBG Therapy receptoraffin peptide Radionuclide, complexing (somatostatin (analogue Lu-177 DOTA-Tate labeling and application Y-90 DOTA-Tate Labeling and application : Mnoclonal antibody Ligand, metallic Zevallin Therapy Pretargeted RIT for High Grade Glioma Pretargeted RIT for Breast Cancer :Liposomes, microspheres, etc TheraSphere & SiraSphere Therapy Locoregional Therapy small molecule 67Cu, 90Y, 186Re-, 188Re, 153SM,131I, 211At ((osteotropic substances Radiation Protection in Theraputic Procedures Understand selection criteria of Radiopharmaceuticals for Therapeutic Procedures Understand the concept of chemical reactions, chelators, PH, sterility and stability Learn Radiopharmacy applications in Therapeutics NM procedures Learn the biodistribution mechanism of Radiopharmaceutical Learn Radiation Safety precautions in Radionuclide Therapy Learn Cells labeling and In-Vivo/In-Vito	

2 Theory + 2 Clinical = 4 credits	**Nuclear Medicine Clinical Procedures (4)**	**RNM 424**
المقرر السابق : **Nuclear Medicine Clinical Procedures (3)** **RNM 413**	This course focus on the basic principles of myocardial perfusion and radionuclide ventriculography studies using both PET and SPECT based tracers including the imaging protocols and clinical applications. The course also aims towards radiation protection methods in cardiac radionuclide theraputec studies. Understand SPECT myocardial perfusion imaging: Radiopharmaceuticals, imaging protocols, Normal distribution, review of drugs used for pharmacological stress Understand SPECT myocardial perfusion imaging: Clinical applications, diagnosis of coronary artery disease, ischemia versus infarction Understand SPECT myocardial perfusion imaging: Viability study, diagnosis of acute infarction/emergency use of myocardial perfusion Understand PET myocardial perfusion: Radiopharmaceuticals, imaging protocols، Normal distribution Understand Radionuclide Ventriculography: Radiopharmaceutical used for blood pool and first pass studies, acquisition techniques Understand Radionuclide ventriculography: Data analysis, study interpretation and clinical applications	

2 Theory = 2 credits	Advanced Techniques and Molecular Imaging	RNM 425
المقرر السابق : **Introduction to Biostatistics** **HFSS 101–1** **Radiation Biology** **RNM 221** **Nuclear Medicine Physics (2)** **RNM 312** **Radiopharmacy and Radiochemistry** **RNM 222**	This course teaches the advanced imaging techniques in nuclear medicine and their application to molecular imaging. The use of molecular imaging in drug development is discussed as an example application. In addition to molecular imaging techniques in nuclear medicine, the other imaging modalities with molecular imaging capabilities such as ultrasound and magnetic resonance imaging are also discussed To provide an understanding of molecular imaging To provide an understanding of advanced imaging techniques in nuclear medicine such as PET/CT and PET/MR To provide an overview of the advanced imaging techniques and other molecular imaging methods and their application to molecular imaging	