

ALLIED HEALTH (ALH)

ALH 119 - INTRODUCTION TO MEDICAL TERMINOLOGY

Medical Terminology is a course that helps students understand the Greek and Latin-based language of medicine and healthcare. Emphasis is placed upon word roots, suffixes, prefixes, abbreviations, symbols, anatomical terms, and terms associated with movements of the human body. This course also stresses the proper pronunciation, spelling, and usage of medical terminology.

Credits: 3

Course Notes: This course does not count towards BIOL major credit.

ALH 251 - INTRODUCTION TO RADIOLOGY & MEDICAL IMAGING

Introductions to the art and science of medical radiography and medical imaging are presented. Included is a discussion of the history of radiology, basic radiation safety and protection, imaging terminology, and an introduction to exposure factors and image formation. Other course components include an introduction to professional organizations, and cultural diversity in healthcare.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 252 - RADIOLOGICAL PROCEDURES I

Radiographic anatomy and positioning skills are presented as they relate to performing radiographic procedures of the human body. Specific areas presented include positioning and procedures of the chest, abdomen, and extremities. Emphasis will be placed on the production of quality images while minimizing radiation exposure to the patient. Laboratory exercises will demonstrate the application of theoretical principles and concepts, while reinforcing didactic lecture content. Commonly-encountered pathological conditions will be examined. Pathology reports will be assigned as part of this course.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 253 - PATIENT CARE IN MEDICAL IMAGING

This course will present basic patient care techniques related to the medical imaging environment. Topics presented include sterile and aseptic technique, standard precautions, venipuncture, patient transfer, care of medical equipment, infection control, patient communication, basic EKG, and monitoring & recording of vital signs.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 254 - RADIOGRAPHY CLINICAL I

This is the first of a sequence of clinical courses designed to introduce students to the hospital clinical setting, while providing an opportunity for students to participate in or observe radiographic procedures. Students will complete general patient care competencies during this course, while rotating through various areas within the radiology department. Additionally, they will begin completing clinical competencies related to the chest, abdomen, routine contrast procedures, mobile examinations, extremities, and pediatric procedures. Students will perform under the supervision of qualified radiographers.

Credits: 2

Course Notes: Acceptance into the RAD clinical program required.

ALH 255 - FLUOROSCOPIC PROCEDURES I

This course examines the radiographic anatomy and positioning skill required to perform radiographic procedures of the digestive system. Also is an overview of contrast media and venipuncture instruction. Emphasis will be placed on the production of quality radiographs while minimizing radiation exposure to the patient and technologist. Pathology reports will be assigned to examine commonly-encountered pathological conditions.

Credits: 1

Course Notes: Acceptance into the RAD clinical program required.

ALH 261 - FLUOROSCOPIC PROCEDURES II

This course examines the radiographic anatomy and positioning skill required to perform radiographic procedures of the urinary, biliary, and reproductive systems. Also included are imaging studies of the spinal cord and arthrography. Emphasis will be placed on the production of quality radiographs while minimizing radiation exposure to the patient and technologist. Pathology reports will be assigned to examine commonly-encountered pathological conditions.

Credits: 2

Course Notes: Acceptance into the RAD clinical program required.

ALH 262 - MEDICAL LAW & ETHICS

This course examines the medicolegal issues involving patient care and medical imaging. Professional Ethics and ethical dilemmas will also be presented. Additional topics include confidentiality, HIPPA, medical documentation and elements of informed consent. Subject matter experts serve as guest presenters.

Credits: 1

Course Notes: Acceptance into the RAD clinical program required.

ALH 264 - IMAGING PRINCIPLES I

Examines the factors controlling and influencing the production of radiographic images. Exercises will demonstrate application of theoretical principles and concepts. Topics include beam filtration, beam restriction, image receptors, computed and digital radiography concepts, radiographic grids, and technical factor selection & manipulation.

Emphasis will be placed on methods of improving radiographic image quality, while emphasizing patient and technologist radiation protection.

Credits: 2

Course Notes: Acceptance into the RAD clinical program required.

ALH 266 - RADIOGRAPHIC PROCEDURES II

Radiographic anatomy and positioning skills are presented as they relate to performing radiographic procedures of the human body. Specific areas presented include the pelvic girdle, bony thorax, spinal column, sacrum & coccyx. Emphasis will be placed on the production of quality images while minimizing radiation exposure to the patient. Laboratory exercises will demonstrate the application of theoretical principles and concepts, while reinforcing didactic lecture content. Commonly-encountered pathological conditions will be examined. Pathology reports will be assigned as part of this course.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 267 - RADIOGRAPHIC CLINICAL II

Students will continue to rotate through various areas of the radiology department and begin surgical rotations. Additional clinical competencies will be obtained on routine spine and cranium procedures, pediatric procedures and mobile studies. Students will continue to perform under the supervision of qualified radiographers.

Credits: 5

Course Notes: Acceptance into the RAD clinical program required.

ALH 280 - FUNDAMENTALS OF SONOGRAPHY

Orientation to basic scanning techniques, instrumentation, acoustic energy, and anatomy and image identification. Students will learn to identify sonographic anatomy and acceptable image parameters and to correlate this information to specific procedures. Students will practice scan to achieve basic skills needed in the clinical setting. This course must be passed prior to continuing in the DMS program.

Credits: 3

Course Notes: Acceptance into the DMS program required.

ALH 281 - MANAGEMENT & METHODS OF PATIENT CARE

Introduction to the basics of nursing techniques, medical professionalism, and patient care. Topics covered include nursing procedures, medical emergencies, ethics, confidentiality, HIPAA, hospital safety, informed consent, conscious sedation, patient transfer, infection control, professional development and certification, departmental organization and administration, QA/QC, and an introduction to hospital administration.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 282 - PATHOPHYSIOLOGY

The course is presented in two parts: general pathology and neoplasia. The general pathology component introduces basic disease concepts, theories of disease causation and system-by-system pathophysiologic disorders most frequently encountered in clinical practice. The neoplasia component provides an in-depth study of new and abnormal development of cells.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 283 - SECTIONAL ANATOMY FOR THE SONOGRAPHER

Study of human anatomy in the transverse, longitudinal, and coronal planes. Emphasis on the organs in the abdomen, pelvis, thorax, and neck. Demonstration of how these structures appear on ultrasound scans, computerized tomography, and MRI.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 284 - ABDOMEN SONOGRAPHY WITH LAB

Study of normal anatomy and sonographic appearances of abdominal structures and superficial structures. Normal variants, congenital anomalies, physiology, and related laboratory tests are covered. Sonographic methods used to visualize abdominal structures and organs. Includes laboratory section on basic scanning techniques.

Credits: 4

Course Notes: Acceptance into the DMS clinical program required.

ALH 285 - OB-GYN SONOGRAPHY WITH EMBRYOLOGY

Study of obstetrical and gynecological anatomy. Clinical applications and sonographic methods used to visualize pelvic organs, the pregnant uterus, and related structures. Discussion of embryogenesis and the reproductive cycle. Study of normal sonographic patterns.

Credits: 3

Course Notes: Acceptance into the DMS clinical program required.

ALH 286 - CLINICAL EDUCATION I: SONOGRAPHY

Application of sonographic scanning procedures in a hospital setting under the supervision of a qualified registered diagnostic sonographer. Emphasis on liver, GB, pancreas, gallbladder, obstetrics, and pelvic areas. Pass-fail grading.

Credits: 3

Course Notes: Acceptance into the DMS clinical program required.

ALH 300A - INTRODUCTION TO SONOGRAPHY & PATIENT CARE

An introduction to the fundamental responsibilities and considerations of the diagnostic medical sonography professional. Topics include; the history of diagnostic medical sonography, sonographic terminology, knobology, biomechanics, ergonomics, scope of practice, accreditation processes, medical ethics, medical law, maintaining health records, pharmacology, infection control, patient transfer methods, obtaining patient history, and vital signs.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 302 - MEDICAL TERMINOLOGY

This online, self-directed course is designed to introduce students to medical terminology. Students will learn anatomical terms, the study of root words, prefixes and suffixes within medical vocabulary. The course provides students the medical terminology associated with the different body systems, radiology and laboratory procedures.

Credits: 1

Course Notes: Must be accepted into Nuclear Medicine clinical training at Northwestern Memorial Hospital.

ALH 305 - ULTRASOUND IMAGE CRITIQUE

Study of image critique, technical factors, and sonographic interpretation. Review of sonographic terminology, image quality factors, scanning protocols and techniques, and normal sonographic appearances of abdominal, OB-GYN, and vascular structures. Integration of clinical history and pathology in the interpretation of pathologic sonograms and Doppler data.

Credits: 2

ALH 306 - SPECIALITY SONOGRAPHY

Study of abdominal, superficial parts, newborn, and invasive procedures. Areas studied include neonatal procedures, breast and prostate pathology, GI tract, soft tissues, musculoskeletal, and invasive procedures. Presentation of pathologic processes, sonographic appearances, and clinical history correlation.

Credits: 2

ALH 307 - PRINCIPLES OF ULTRASOUND PHYSICS I

Introduction and study of the fundamental principles of diagnostic ultrasound physics. Study of various diagnostic ultrasound equipment along with instrumentation and quality control.

Credits: 3

ALH 308 - PRINCIPLES OF ULTRASOUND PHYSICS II

Continuation of the study of principles of diagnostic ultrasound physics, including artifacts, Doppler, 3D, harmonic imaging, contrast agents, bioeffects and safety.

Credits: 3

ALH 309 - OBSTETRICAL/GYNECOLOGICAL PATHOLOGY

Study of obstetrical and gynecological pathology. Instrumentation and techniques for optimization of sonographic obstetrical and gynecological images are reviewed. Comparison of normal sonographic patterns with pathology appearances, physiology, differentials, and correlation with lab tests and related organ involvement. Discussion and correlation of congenital abnormalities, causes, and sonographic appearances.

Credits: 4

ALH 310 - CLINICAL EDUCATION II

This course emphasizes clinical experience progression under the supervision of faculty, sonography staff, and clinical instructor. Continued practicum in the clinical applications of abdominal sonography, female pelvis, and obstetrical applications. Effective communication, operation of equipment, patient care, and technical skills developed.

Credits: 3

ALH 310A - SONOGRAPHY PRINCIPLES & INSTRUMENTATION I

An introduction to the fundamentals and characteristics of physics principles applied in the use of diagnostic medical sonography. Basic theories of physics and instrumentation are discussed and reviewed with an emphasis on clinical application including; sound wave parameters, pulsed waves, intensity, interactions of sound waves and media, range equation, transducer construction, beam focusing, axial resolution, lateral resolution, and two-dimensional imaging.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 311 - ABDOMINAL PATHOLOGY

This course emphasizes clinical experience progression under the supervision of faculty, sonography staff, and clinical instructor. Continued practicum in the clinical applications of abdominal sonography, female pelvis, and obstetrical applications. Effective communication, operation of equipment, patient care, and technical skills developed.

Credits: 3

ALH 311A - SONOGRAPHY PRINCIPLES AND INSTRUMENTATION II

The continuation of ALH 310A with the introduction of advanced theories of physics and instrumentation including; Doppler physics, hemodynamics, dynamic range, image artifacts, contrast agents, and real-time imaging.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 312 - DMS PRINCIPLES & INSTRUM. III

The continuation of ALH 311A with the introduction to optimizing the Doppler image, quality assurance, bioeffects, and ultrasound artifacts.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 312A - SONOGRAPHY PRINCIPLES & INSTRUMENTATION III

The continuation of ALH 311A with the introduction to optimizing the Doppler image, quality assurance, bioeffects, and ultrasound artifacts.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 313 - PATIENT CARE MANAGEMENT I

See clinical advisor for more information on this course.

Credits: 2

Course Notes: Acceptance into clinical program

ALH 316 - PATHOLOGY

This course will introduce the student to the concept of diseases. Emphasis will be placed on different types of growths, causative factors, and biological behavior. Etiology and clinical manifestations will be described.

Credits: 2

Course Notes: Acceptance to clinical program

ALH 317 - RADIATION PHYSICS I

Basic knowledge of physics pertinent understanding radiations used in clinical settings.

Credits: 2

Course Notes: Acceptance to clinical program.

ALH 318 - RADIATION PHYSICS II

This course is designed to review and expand concepts and theories in the Radiation Physics course. Detailed analysis of the structure of matter, properties of radiation, nuclear transformation, x-ray production, and interactions of ionizing radiation are emphasized. Also presented are treatment units used in external radiation therapy, measurement and quality of ionizing radiation produced, absorbed dose measurement, dose distribution, and scatter analysis. In addition, the course will include properties of photon and electron beams, electron beam therapy, and brachytherapy.

Credits: 3

Course Notes: Acceptance into clinical program

ALH 320 - CLINICAL HEMATOLOGY & COAGULATION

In the Hematology Laboratory students learn to count and classify the various types of red and white blood cells. They also learn how to determine whether the oxygen-carrying red blood cells are in a healthy state, An essential procedure for diagnosis of anemia. In addition, the students will be shown how to classify the cells in the bone marrow to assist the pathologist in the identification of leukemia and other blood disorders.

Credits: 6

Course Notes: Acceptance into the MDTC clinical program.

ALH 320A - ABDOMINAL SONOGRAPHY I

The first of a multi-course sequence covering normal anatomy, physiology, and pathology of the abdominal organs and superficial structures. Emphasis will be placed on the sonographic features, clinical presentation, and scan protocol of the great vessels, liver, biliary system, pancreas, gastrointestinal tract, and the abdominal wall.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 321 - MICROBIO, MYCOLOGY, PARASITOLOGY

The Microbiology Laboratory has the responsibility of isolating and identifying potentially pathogenic microorganisms. In many cases the laboratory also determines the susceptibility of the etiologic agent to a variety of antibiotics. This laboratory is divided into Bacteriology, Mycology, Mycobacteriology, Parasitology, and Virology.

Credits: 8

Course Notes: Acceptance into clinical program

ALH 321A - ABDOMINAL SONOGRAPHY I LAB

Application of ultrasound scan techniques and imaging protocols of the great vessels, liver, pancreas, biliary system and pleural space.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 322 - CLINICAL CHEMISTRY

State-of-the art automation and robotics enable the laboratory to provide critical diagnostic information quickly and accurately to physicians in such areas as the emergency department, intensive care, surgery and the neonatal intensive care unit. In addition, the Clinical Chemistry Laboratory offers testing for the assessment of many metabolic systems that can include cholesterol measurement, thyroid and reproductive hormone levels, and therapeutic drug monitoring. Students will work with up-to-date, computer-assisted technology to provide critical as well as routine testing for effective patient care.

Credits: 5

Course Notes: Acceptance into clinical program.

ALH 322A - ABDOMEN SONOGRAPHY II

The continuation of ALH 320A with the introduction of the anatomy, physiology, pathology, and pathophysiology of the spleen, thyroid, urinary system, retroperitoneum, scrotum, prostate, and the musculoskeletal system. An emphasis will be placed on the sonographic features, clinical presentations, and scan protocols.

Credits: 3

Course Notes: Acceptance into the DMS clinical program required.

ALH 323 - CLINICAL IMMUNOLOGY

The Immunopathology Laboratory performs state-of-the-art testing in Flow Cytometry and Diagnostic Immunology. In Flow Cytometry special emphasis is placed on diagnosis of leukemias and lymphomas and monitoring of immunologic pathologies. Rotation through the Immunology section includes performance of protein chemistry and infectious disease serology; detection of tumor markers; and pregnancy and prenatal diagnosis.

Credits: 3

Course Notes: Acceptance into the MDTC clinical program.

ALH 323A - ABDOMINAL SONOGRAPHY II LAB

Application of ultrasound scan techniques and imaging protocols of the spleen, thyroid, urinary system, prostate, salivary glands, Achilles' tendon, water bath scanning, stand-off pads.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 324 - CLINICAL IMMUNOHEMATOLOGY

Tests are conducted in the Coagulation section of the Hematology Laboratory to determine the presence or absence of factors essential to normal blood coagulation. Special procedures are performed to identify acquired and inherited deficiencies of the coagulation proteins.

Credits: 5

Course Notes: Acceptance into the MDTC clinical program.

ALH 325 - URINALYSIS & BODY FLUIDS

In the Body Fluids section of this rotation, body fluids are examined to determine the kinds and numbers of body cells present. It is in this laboratory that both quantitative and qualitative testing of urine is done. Urinalysis involves testing for pH, color, specific gravity, sugars and excessive amounts of protein. Specimens are also examined for the presence of bacteria and parasites as well as crystals and casts formed by the kidneys.

Credits: 2

Course Notes: Acceptance into the MDTC clinical program.

ALH 326 - CLINICAL EDUCATION II

This course emphasizes clinical experience progression under the supervision of faculty, sonography staff, and clinical instructor. Continued practicum in the clinical applications of abdominal sonography, female pelvis, and obstetrical applications. Effective communication, operation of equipment, patient care, and technical skills developed. Pass-fail grading.

Credits: 3

Course Notes: Acceptance into the DMS clinical program required.

ALH 327 - PHLEBOTOMY

Lectures and clinical rotation demonstrating the proper collection and processing of blood for routine and special tests are given. Both venipuncture and dermal puncture techniques are presented. Medical Laboratory Science students will gain competence drawing blood for laboratory testing in the Outpatient Laboratory and hospital patient care units.

Credits: 1

Course Notes: Acceptance into clinical program.

ALH 328 - MOLECULAR DIAGNOSTICS

The Molecular Diagnostics Laboratory is the fastest growing laboratory in our institution, reflecting the explosion in knowledge about the human genome and the availability of new tools to examine DNA and RNA. Highly sensitive nucleic acid amplification methods, including real-time PCR, are used to detect low concentrations of infectious agents such as Herpes simplex virus. Quantitative (viral load) tests for hepatitis C and HIV nucleic acid are used to monitor response to therapy.

Credits: 1

Course Notes: Acceptance into the MDTC clinical program.

ALH 329 - INTRODUCTION TO MEDICAL LABORATORY SCIENCES

Group dynamics, basic educational theory, the five functions of management and a variety of related topics are presented through lecture and group activities.

Credits: 2

Course Notes: Acceptance into the MDTC clinical program.

ALH 330 - CLINICAL EDUCATION III

The student begins to demonstrate full competency in various exams and advances toward more independent scanning under the supervision of sonography staff and clinical instructor. Emphasis remains on abdominal, small parts, and obstetrical-gynecological sonography. The student will have an opportunity to refine skills and increase self-confidence through progressively more independent scanning. Overview of hospital operations, including departmental billing policies. Pass-fail grading.

Credits: 3

Course Notes: Acceptance into the DMS clinical program required.

ALH 330A - OBSTETRICS AND GYNECOLOGY SONOGRAPHY I

The first of a multi-course sequence covering the normal anatomy, physiology, pathology, and pathophysiology of the female pelvis including embryology and first trimester fetal development, fetal anomalies, and the management of maternal and fetal disease from the sonographic assessment perspective.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 331 - INTRODUCTION TO PEDIATRICS AND VASCULAR IMAGING

Discussion of pediatric and neonatal anatomy and imaging techniques. Newborn and pediatric pathologies are reviewed. Basic adult vascular imaging is discussed, including peripheral vasculature and carotid artery anatomy and pathology. Imaging techniques, protocols, spectral and color flow Doppler interrogation and interpretation are reviewed. Peripheral venous and carotid imaging is performed in a laboratory setting.

Credits: 1

ALH 331A - OBSTETRICS AND GYNECOLOGY SONOGRAPHY I LAB

Application of ultrasound scan techniques and imaging protocols of the female pelvis including the vagina, cervix, uterus, ovaries, and adnexa.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 332 - CLINICAL EDUCATION IV WITH SPECIALTIES

In this final period of clinical study, the student demonstrates full competency and progresses to full independence under the supervision of sonography staff and clinical instructor. Emphasis on accuracy and efficiency in pathology identification, diagnosis, and related organ involvement documentation. Rotations in the practice of peripheral vascular exams, pediatrics, breast imaging, and other specialties within the field may be arranged.

Credits: 4

ALH 332A - OBSTETRICS AND GYNECOLOGY SONOGRAPHY II

The continuation of ALH 330A with the introduction of the normal anatomy, anomalies, pathology, and pathophysiology of the developing human fetus and female pelvis in the second and third trimester. Emphasis will be placed on the sonographic features, clinical presentations, and scan protocols.

Credits: 3

Course Notes: Acceptance into the DMS clinical program required.

ALH 333 - LABORATORY MANAGEMENT

General introduction to laboratory management for the Histotechnologist; emphasis on theories, methods, and techniques used in management, with specific application to the laboratory.

Credits: 2

Course Notes: Acceptance into the histotechnology clinical training program.

ALH 333A - OB/GYNO SONOGRAPHY II LAB

Application of ultrasound scan techniques and imaging protocols of the gravid female pelvis.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 334 - INTRODUCTION TO HISTOTECHNOLOGY

Principles and theories of histotechnology; safety and regulatory requirements; reagents; dilutions; basics of histology.

Credits: 2

Course Notes: Acceptance into the histotechnology clinical training program.

ALH 336 - PROCESSING & EMBEDDING TISSUES

Principles and theories of embedding processes; methods of preparing and orienting tissues.

Credits: 3

Course Notes: Acceptance into the histotechnology clinical training program.

ALH 337 - MICROTOMY/INSTRUMENTATION

Principles and theories of microtomy processes; methods of preparing tissues; laboratory and restoration.

Credits: 3

Course Notes: Acceptance into the histotechnology clinical training program.

ALH 338 - ROUTINE STAIN AND QUALITY CONTROL

Principles and theories of staining procedures; evaluation of different methods of staining; equipment troubleshooting, quality control processes and slide review.

Credits: 2

Course Notes: Acceptance into the histotechnology clinical training program.

ALH 339A - CLINICAL EDUCATION IV

A continuation of ALH 392A that builds on the practical implementation of the sonographic imaging and patient care processes in a clinical setting where student observe, assist, and perform a variety of sonographic examinations under the guidance of a registered diagnostic sonographer. Emphasis will be placed on abdomen, superficial structures, obstetric, gynecology, and vascular exams. The opportunity to rotate through specialty clinics will present including; pediatric, musculoskeletal, breast, interventional radiology, and the vascular lab.

Credits: 4

ALH 340 - MANAGEMENT AND METHODS OF PATIENT CARE

This course introduces students to concepts and applications centered on patient care, such as body mechanics, phlebotomy, vital signs, and other basic healthcare needs. Focus is placed on the basic measures necessary to provide quality patient care. This course will also cover medical ethics and legal considerations in healthcare. Students will also participate in written research projects related to nuclear medicine technology.

Credits: 3

Course Notes: Must be accepted into Nuclear Medicine clinical at Northwestern Memorial Hospital.

ALH 341 - RADIATION BIOLOGY

This course provides fundamental knowledge of the effects of radiation exposure on biologic systems. Emphasis is placed on the radiation interaction on a cellular level, including the formation of free radicals, chromosome breakage, and repair mechanisms. Cell survival curves, acute radiation syndromes, somatic and genetic effects, and in utero exposure will also be presented.

Credits: 1

Course Notes: Must be accepted into Nuclear Medicine clinical training at Northwestern Memorial Hospital.

ALH 342 - RADIATION DETECTION AND INSTRUMENTATION

This course evaluates the maintenance and function of instrumentation used in nuclear imaging and in the laboratory. This course exclusively covers SPECT, SPECT/CT, PET and PET/CT operations and performance. Different types of quality assurance for these systems is covered especially flood field uniformity, bar phantom imaging, resolution, sensitivity, linearity, scatter determination, dead time corrections and CT attenuation accuracy. Emphasis is placed on the operation and maintenance of computer hardware. The course also evaluates data collection,

Credits: 3

Course Notes: Must be accepted into Nuclear Medicine clinical training at Northwestern Memorial Hospital.

ALH 343 - REGISTRY REVIEW

Comprehensive registry reviews for the ARDMS examinations. Practice exams and mock registries are an integral part of this review. Applications for registry examinations are provided and reviewed.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 344 - DIAGNOSTIC NUCLEAR IMAGING CLINICAL PRACTICUM I

This course allows for students to perform a wide variety of nuclear medicine procedures, including in-vivo, in-vitro, diagnostic and therapeutic treatments in multiple clinical settings under direct supervision of qualified medical professionals. Within this course students will develop clinical competence in nuclear medicine procedures, computed tomography procedures, radiopharmacy techniques, radiation safety techniques and imaging analysis.

Credits: 4

Course Notes: Must be accepted into nuclear medicine clinical program at Northwestern Memorial Hospital.

ALH 345 - RADIATION SAFETY & PROTECTION

The purpose of this course is to provide students with information regarding institutional, state, and federal regulations regarding radiation exposure, disposal of sources, and radiation-producing equipment. Topics covered in this course include: public and occupational dose limits, radiation detection, and radioactivity. Principles of ALARA and reducing radiation exposure will be emphasized throughout.

Credits: 2

Course Notes: Must be accepted into Nuclear Medicine clinical training at Northwestern Memorial Hospital.

ALH 346 - RADIONUCLIDE CHEM & RADIOPHARM

This course provides a study of the chemical, physical and biological properties of radiopharmaceuticals used in diagnosis and therapy. Emphasis will be placed on the production, preparation and calculation of radiopharmaceuticals including quality control and radiation safety.

Credits: 3

Course Notes: Must be accepted into Nuclear Medicine clinical training at Northwestern Memorial Hospital.

ALH 347 - CLINICAL CORRELATION-PATHOLOGY

This is a hybrid course that introduces the student to the science of pathology. The basic principles of pathology will be presented with an emphasis on understanding the mechanism of development of the disease process. Cellular adaptation, inflammation, immunology, body systems, and neoplasia will be presented.

Credits: 2

Course Notes: Must be accepted into Nuclear Medicine clinical training program at Northwestern Memorial Hospital.

ALH 348 - DIAGNOSTIC NUCLEAR IMAGING PRACTICUM II

This course allows for students to perform a wide variety of nuclear medicine procedures, including in-vivo, in-vitro, diagnostic and therapeutic treatments in multiple clinical settings under direct supervision of qualified medical professionals. Within this course students will develop clinical competence in nuclear medicine procedures, computed tomography procedures, radiopharmacy techniques, radiation safety techniques and imaging analysis.

Credits: 4

Course Notes: Must be accepted into Nuclear Medicine clinical training program at Northwestern Memorial Hospital.

ALH 349 - CLINICAL NUCLEAR MEDICINE PROCEDURES I

This course provides students with the theory and techniques of clinical procedures used in nuclear medicine imaging. Areas of emphasis include patient care, imaging techniques, use and identification of radiopharmaceuticals, adjunct pharmaceuticals and computer postprocessing techniques. The course will include imaging techniques for general nuclear medicine, nuclear cardiology, PET/CT and bone mineral density.

Credits: 4

Course Notes: Must be accepted into Nuclear Medicine clinical program at Northwestern Memorial Hospital.

ALH 350 - RADIATION PHYSICS & INSTRUMENTATION

This course provides a study of atomic and nuclear structure, radioactive decay modes, mathematics of decay, production of electromagnetic and charged particles, and interaction of ionizing radiation with matter. The course will also introduce students to different types of radiation detectors, such as gas filled, scintillation and semiconductors.

Credits: 3

Course Notes: Must be accepted into Nuclear Medicine clinical training program at Northwestern Memorial Hospital.

ALH 350A - VASCULAR SONOGRAPHY I

The first of a multi-course sequence assessing the anatomy, pathology, and related hemodynamics of the vascular system from the sonographic imaging perspective. Pathology, clinical signs, and systems, applicable laboratory values, pathophysiology, and differential diagnosis will be presented.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 351A - VASCULAR SONOGRAPHY I LAB

Application of ultrasound scan techniques and imaging protocols of the upper and lower extremity arterial systems and the extracranial duplex.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 352 - RADIATION SAFETY & PROTECTION

The student will be provided with the basic principles and concepts of radiation protection and safety. Radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies, and health care organizations are incorporated. Specific responsibilities of the radiation therapist are discussed, examined, performed, and evaluated.

Credits: 1

Course Notes: Acceptance into clinical program.

ALH 352A - VASCULAR SONOGRAPHY II

The second of a multi-course sequence assessing the anatomy, pathology, and related hemodynamics of the vascular system from the sonographic imaging perspective. Pathology, clinical signs, and systems, applicable laboratory values, pathophysiology, and differential diagnosis will be presented.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 353 - MEDICAL IMAGING FOR RADIATION THERAPY

This course is designed to establish a knowledge base in factors that govern and influence the production and recording of radiographic images for patient simulation, treatment planning, and treatment verification in radiation oncology. Radiation oncology imaging equipment and related devices will be emphasized. Class demonstrations/labs are used to demonstrate the application of theory.

Credits: 2

Course Notes: Acceptance to clinical program

ALH 353A - VASCULAR SONOGRAPHY II LAB

Application of ultrasound scan techniques and imaging protocols of the upper and lower extremity venous systems, liver Doppler, and renal Doppler.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 354 - PRINCIPLES AND PRACTICE I

This course will provide the student with the fundamentals of clinical radiation oncology. Malignant conditions, their etiology, and methods of treatment are discussed. Attention is given to patient prognosis, treatment results, and the effects of combined therapies. In addition, this course will review calculations necessary for the various patient setups and treatments.

Credits: 3

Course Notes: Acceptance to clinical program

ALH 355 - PRINCIPLES & PRACTICE II

This course is a continuation of Principles and Practice I. This course will provide the student with the fundamentals of clinical radiation oncology. Malignant conditions, their etiology, and methods of treatment are discussed. Attention is given to patient prognosis, treatment results, and the effects of combined therapies. In addition, this course will review calculations necessary for the various patient setups and treatments.

Credits: 3

Course Notes: ACCEPTANCE INTO THE CLINICAL TRAINING PROGRAM FOR RADIATION THERAPY TECHNOLOGY

ALH 357 - CLINICAL PRACTICUM I

These courses will provide the student with the fundamentals of clinical radiation oncology. The medical, biological, and pathological aspects as well as the physical and technical aspects will be discussed. The diagnosis, treatment prescription, the documentation of treatment parameters and delivery, emergency procedures, and patient condition and education needs will also be presented, discussed, examined, and evaluated. The course is also designed to examine and evaluate the management of neoplastic disease using knowledge in arts and sciences, while promoting critical thinking and the basis of ethical clinical decision making.

Credits: 2-3

Course Notes: Acceptance into clinical program

ALH 358 - CLINICAL PRACTICUM II

Content is designed to provide sequential development, application, analysis, integration, synthesis, and evaluation of concepts and theories in radiation therapy. Through structured sequential assignments in clinical facilities, concepts of team practice, patient-centered clinical practice, and professional development shall be discussed, examined, and evaluated. This includes supervised clinical education, which offers a sufficient and well-balanced variety of radiation treatments, examinations, and equipment. Various rotations include: three general radiation therapy treatment rooms, Simulator/CT simulator, Nursing Department, and Physics/Dosimetry Department.

Credits: 4

ALH 360 - QUALITY MANAGEMENT & HEALTHCARE OPERATIONS

This course will focus on the evolution of quality management (QM) programs and continuing quality improvement in radiation oncology. A comprehensive overview of linear accelerator and CT quality assurance (QA) will be presented. Topics covered in this course include: the radiation therapist's role in fostering a culture of safety, daily, monthly and annual quality assurance procedures for linear accelerators and CT simulators, record keeping, and linear accelerator acceptance and commissioning. Regulatory agencies, information systems, and legal issues related to quality assurance will also be presented. This course also examines the US healthcare system and provides an overview of healthcare operations with emphasis on insurance, billing, reimbursement, continuous quality improvement (CQI), project management, Human Resources, accreditation, and licensing and certification.

Credits: 2

Course Notes: Acceptance into clinical program No additional credit granted for ALH 360 as QUALITY ASSURANCE HEALTH OPS

ALH 360A - PEDIATRIC & BREAST SONOGRAPHY

An introduction to the anatomy, anomalies, pathology, and pathophysiology of the pediatric abdomen, pediatric gastrointestinal tract, neonatal spine, infant hips, neurosonography, and breast. Comparative diagnostic imaging modality relating to anatomy and pathology of the breast will also be reviewed.

Credits: 1

Course Notes: Acceptance into the DMS clinical program required.

ALH 361 - ADVANCED IMAGING IN RADIATION THERAPY

This course is designed to provide an overview of computed tomography and magnetic resonance imaging with an emphasis on CT and MRI physics & instrumentation, image production and manipulation, radiation safety, contrast media, and patient considerations. This course will also provide students with a review of cross-sectional anatomy of the brain, head and neck, thorax, abdomen, and pelvis.

Credits: 1

Course Notes: Acceptance into clinical training program for Radiation Therapy Technology Required. No additional credit granted for ALH 361 as INTRO COMP TOMOGRAPHY

ALH 362 - OPERATIONAL ISSUES

This course will familiarize the student with the patient chart and its content. All components of the legal document will be defined and discussed, ensuring that students know how to use proper documentation and find information relevant to the patient's treatment.

Credits: 1

Course Notes: Acceptance into clinical program

ALH 363 - TECHNICAL RADIATION I

This course is a continuation of Technical Radiation Therapy I with discussions of various treatment and simulation procedures the different pathologies. The lab component will continue to provide a hands-on, sequential application, and clinical integration of concepts and theories in the radiation therapy clinic.

Credits: 3

Course Notes: Must be accepted into clinical training.

ALH 364 - TECHNICAL RADIATION THERAPY II

This course is a continuation of Technical Radiation Therapy I with discussions of various treatment and simulation procedures the different pathologies. The lab component will continue to provide a hands-on, sequential application, and clinical integration of concepts and theories in the radiation therapy clinic.

Credits: 3

Course Notes: Must be accepted into clinical training.

ALH 370 - COMPUTED TOMOGRAPHY AND CROSS-SECTIONAL ANATOMY

This course introduces the fundamental concepts and principles of computed tomography (CT) technology and its role in medical imaging. Content within the course will cover equipment, instrumentation, data acquisition, image processing, reconstruction and image quality of computed tomography. Emphasis of the course will be placed on patient considerations, safety and radiation protection. Students will also learn to identify anatomical structures in cross sectional anatomy of the head, neck, thorax, abdomen and pelvis.

Credits: 2

Course Notes: Must be accepted into Nuclear Medicine clinical training at Northwestern Memorial Hospital.

ALH 371 - CLINICAL NUCLEAR MEDICINE PROCEDURES II

This course provides students with the theory and techniques of clinical procedures used in nuclear medicine imaging. Areas of emphasis include patient care, imaging techniques, use and identification of radiopharmaceuticals, adjunct pharmaceuticals and computer postprocessing techniques. The course will include imaging techniques for general nuclear medicine, nuclear cardiology, PET/CT and bone mineral density

Credits: 3

Course Notes: Must be accepted into Nuclear Medicine clinical training at Northwestern Memorial Hospital.

ALH 372 - NUCLEAR MEDICINE SEMINAR

This course provides students with the mechanics needed to develop a resume, prepare for an interview and participate in mock interviews. Students will also develop and master their presentation skills through nuclear medicine technology research. Also, an emphasis will be applied to various allied health operational issues such as accreditation, billing and reimbursement. The course will also prepare students for the certification exam in Nuclear Medicine. Students will have a structured board review with a series of lectures, comprehensive examinations and test taking strategies.

Credits: 1

Course Notes: Must be accepted into Nuclear Medicine clinical training at Northwestern Memorial Hospital.

ALH 375 - IMMUNOHISTOCHEMISTRY

Advanced aspects of histological procedures used in clinical settings. The course will focus on the theoretical basis of immunohistochemistry.

Credits: 3

ALH 376 - ELECTRON MICROSCOPY

Advanced aspects of histological procedures used in clinical settings. The course will focus on the theoretical basis of electron microscopy.

Credits: 2

Course Notes: Must be admitted into the Histotechnology clinical placement

ALH 377 - SPECIAL STAINS

Advanced aspects of histological procedures used in clinical settings. The course will focus on the theoretical basis of special stains.

Credits: 4

Course Notes: Must be admitted into the Histotechnology clinical placement

ALH 378 - HISTOTECHNOLOGY PROCESS IMPROVEMENT

Capstone course for the histotechnology program. Students will conduct a process improvement project in the laboratory. Students will be required to work collaboratively in the design, implementation, and presentation of their process improvement project.

Credits: 2

Course Notes: Must be admitted into the Histotechnology clinical placement

ALH 379 - SEMINAR- ED & RES IN HISTOLOGY

Presentation of reports, discussions, lectures and papers on selected topics in Histotechnology.

Credits: 3

Course Notes: Must be admitted into the Histotechnology clinical placement

ALH 380 - RADIATION PHYSICS

An introduction to basic concepts of physics with emphasis on the fundamentals of x-ray generating equipment. Topics include atomic structure, the structure of matter, ionization, magnetism & electromagnetism, electrodynamics, the control of high voltage and rectification, x-ray tubes, x-ray circuits, and the production & characteristics of radiation.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 380A - DIAGNOSTIC MEDICAL SONOGRAPHY SEMINAR

This course presents an integrated coverage of ultrasound topics, as related to image production and evaluation, ultrasound procedures, and patient care and management. Emphasis is placed on the development of skills, attitudes, and knowledge necessary to exercise independent judgment and discretion in the performance of ultrasound imaging procedures.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 381 - OPERATIONAL ISSUES IN THE HEALTHCARE ENVIRONMENT

Content is designed to focus on various allied health operational issues. CQI project development and evaluation and assessment techniques will be emphasized. Human resource issues and regulations impacting the healthcare professional will be examined. Accrediting agencies and the licensed practitioner's role in the accreditation process will be emphasized. Billing and reimbursement issues will also be presented.

Credits: 1

Course Notes: Acceptance into the RAD clinical program required.

ALH 382 - IMAGING PRINCIPLES II

This course is designed as a continuation of RAD 104. Course focus will be on continued knowledge development of the factors governing and influencing the production of radiographic images. Topics include technique chart formation, recorded detail and image distortion, processor quality assurance (QA) concepts, radiographic QA and quality control (QC), and digital imaging principles. Causes of poor image quality and improvement of sub-optimal images will be emphasized throughout. The technical factor competency exam will be administered at the end of the course.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 382A - PROFESSIONAL RESEARCH

This course emphasizes both research and accreditation procedures of a sonography program with original research presented using oral and graphic methods as a group project.

Credits: 2

Course Notes: Acceptance into the DMS clinical program required.

ALH 383 - RADIOGRAPHIC PROCEDURES III

Radiographic anatomy and positioning skills are presented as they relate to performing radiographic procedures of the human body. Specific areas presented include the skull, facial and nasal bones, zygomatic arches, paranasal sinuses and mandible. Emphasis will be placed on the production of quality images while minimizing radiation exposure to the patient. Laboratory exercises will demonstrate the application of theoretical principles and concepts, while reinforcing didactic lecture content. Commonly-encountered pathological conditions will be examined.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 384 - IMAGING EQUIPMENT & MODALITIES

This course is designed to examine the equipment routinely used in the production of diagnostic images in greater depth. Various recording media and techniques are discussed. Topics include: radiographic equipment, image intensified fluoroscopy, recording media and techniques, image noise, specialized imaging equipment, and state and federal regulations. An overview of other imaging modalities will also be presented including IR, Mammography, Radiation Therapy, Nuclear Medicine, PET, BMD, CT and Sonography.

Credits: 2

Course Notes: Acceptance into the RAD clinical program required.

ALH 385 - RADIATION BIOLOGY & PROTECTION

The principles of cellular irradiation are presented. Radiation effects on cells and the factors affecting cellular response are included in addition to acute and chronic effects. Other topics include: radiation detection and measurement, patient protection, personnel protection, absorbed dose equivalencies, agencies and regulations, an introduction to radiation biology.

Credits: 2

Course Notes: Acceptance into the RAD clinical program required.

ALH 386 - INTRODUCTION TO CT & CROSS-SECTIONAL ANATOMY

This course is designed to present a more in depth overview of CT Scanning and cross-sectional anatomy. Specific topics include the physics & instrumentation of CT scanning, image production, and cross-sectional anatomy of the head, neck, thorax, abdomen and pelvis. Emphasis will be placed on patient considerations, patient safety, and radiation protection.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 387 - ARRT REVIEW

This course is offered during the final two quarters of the radiography program and is designed to review materials presented throughout the curriculum. The intent of this course is to prepare students for the certification examination in radiography administered by the American Registry of Radiologic Technologists (ARRT). A hybrid of on-line activities, classroom discussions, with problem-solving / self-assessment activities will be utilized.

Credits: 3

Course Notes: Acceptance into the RAD clinical program required.

ALH 388 - RADIOGRAPHIC CLINICAL III

This course continues to provide a clinical setting in which students continue to develop proficient clinical skills. Students will continue rotating through modalities in order to gain knowledge of other aspects of medical imaging. Terminal competency evaluations will begin during this clinical course. Students will complete any remaining procedural and general patient care competencies.

Credits: 4

Course Notes: Acceptance into the RAD clinical program required.

ALH 389 - FIXATION/GROSS PATHOLOGY

Gross room operations will include specimen receiving, assessment, common surgical procedures and terminology, specimen dissection plans of various types of tissues and basic grossing techniques and requirements. Intermediate and advanced knowledge in the theory of fixation. This includes anatomy fixation of tissues, types of fixation, action of major single and combination fixatives, special fixative, factors affecting the quality of fixation, fixation for selected individual tissue, incompatible stains and fixatives, useful formulas for fixatives and dehydration cross-linking fixatives.

Credits: 3

ALH 390 - MICROANATOMY

Study of microscopic structure of human tissues and organs. Material will emphasize the relationship between structure and function in tissues and organs.

Credits: 3

Course Notes: Must be admitted into the Histotechnology clinical placement

ALH 390A - CLINICAL EDUCATION I

Application of sonographic scanning procedures in a hospital setting under the supervision of a qualified registered diagnostic sonographer. Emphasis on liver, GB, pancreas, gallbladder, obstetrics, and pelvic areas. Pass-fail grading.

Credits: 3

ALH 391 - IMMUNOFLUOR/ENZYME/IN SITU

Fundamentals and practice of immunofluorescences, enzyme histochemistry and in situ hybridization. Acquire basic knowledge on specimen preparation, development of reagents, various methods and visualization of final results.

Credits: 2

Course Notes: Must be admitted into the Histotechnology clinical placement

ALH 391A - CLINICAL EDUCATION II

Practical implementation of the sonographic imaging and patient care process in a clinical setting where students will observe, assist, and perform a variety of sonographic examinations under the guidance of a registered diagnostic sonographer. Emphasis will be placed on abdomen, superficial structures, obstetric, gynecology, and vascular exams.

Credits: 3

ALH 392 - CLINICAL ROTATIONS

Rotations through various areas in the surgical and anatomic pathology labs.

Credits: 4

Course Notes: Must be admitted into the Histotechnology clinical placement

ALH 392A - CLINICAL EDUCATION III

A continuation of ALH 391A that builds on the practical implementation of the sonographic imaging and patient care processes in a clinical setting where student observe, assist, and perform a variety of sonographic examinations under the guidance of a registered diagnostic sonographer. Emphasis will be placed on abdomen, superficial structures, obstetric, gynecology, and vascular exams.

Credits: 3

ALH 393A - CLINICAL EDUCATION IV

A continuation of ALH 392A that builds on the practical implementation of the sonographic imaging and patient care processes in a clinical setting where student observe, assist, and perform a variety of sonographic examinations under the guidance of a registered diagnostic sonographer. Emphasis will be placed on abdomen, superficial structures, obstetric, gynecology, and vascular exams. The opportunity to rotate through specialty clinics will present including; pediatric, musculoskeletal, breast, interventional radiology, and the vascular lab.

Credits: 4

Course Notes: No additional credit granted for ALH 332