

ALLIED HEALTH TECHNOLOGY (AHT)

AHT 310 | DIAGNOSTIC NUCLEAR IMAGING CLINICAL PRACTICUM I | 4 quarter hours

(Undergraduate)

Supervised clinical education that gives the student the opportunity to perform a variety of patient procedures on both SPECT, SPECT/CT, PET and PET/CT imaging systems for all diagnostic, therapeutic, non-imaging in-vivo and in-vitro procedures. Clinical competencies developed in patient care, positioning techniques, analyzing images, and the selection of imaging parameters and collimators. Knowledge of integrated computer systems designed for use with clinical gamma cameras, Single Photon Emission Computed Tomography (SPECT), SPECT/CT, Positron Emission Tomography (PET), and PET/CT images. The clinical practicum is designed to promote independent critical thinking, balanced responsibility, organization and accountability in the student. Students will demonstrate competence in all procedures presented.

AHT 311 | DIAGNOSTIC NUCLEAR IMAGING CLINICAL PRACTICUM II | 4 quarter hours

(Undergraduate)

Supervised clinical education that gives the student the opportunity to perform a variety of patient procedures on both SPECT, SPECT/CT, PET and PET/CT imaging systems for all diagnostic, therapeutic, non-imaging in-vivo and in-vitro procedures. Clinical competencies developed in patient care, positioning techniques, analyzing images, and the selection of imaging parameters and collimators. Knowledge of integrated computer systems designed for use with clinical gamma cameras, Single Photon Emission Computed Tomography (SPECT), SPECT/CT, Positron Emission Tomography (PET), and PET/CT images. The clinical practicum is designed to promote independent critical thinking, balanced responsibility, organization and accountability in the student. Students will demonstrate competence in all procedures presented.

AHT 312 | CLINICAL NUCLEAR MEDICINE PROCEDURES I | 4 quarter hours

(Undergraduate)

Emphasis on theory and techniques of clinical procedures used in nuclear medicine imaging. Areas emphasized include patient care, developing acquisition parameters, imaging techniques, radionuclide identification, energies, half-lives, and principles of radionuclides in imaging and non-imaging procedures. Students will continue to develop an increased degree of competence in their performance of the skills related to critical thinking and problem solving.

AHT 313 | CLINICAL NUCLEAR MEDICINE PROCEDURES II | 4 quarter hours

(Undergraduate)

Emphasis on theory and techniques of clinical procedures used in nuclear medicine imaging. Areas emphasized include patient care, developing acquisition parameters, imaging techniques, radionuclide identification, energies, half-lives, and principles of radionuclides in imaging and non-imaging procedures. Students will continue to develop an increased degree of competence in their performance of the skills related to critical thinking and problem solving.

AHT 314 | MANAGEMENT AND METHODS OF PATIENT CARE I | 4 quarter hours

(Undergraduate)

Skills in problem solving, critical-thinking, and decision-making are developed as well as oral and written communication skills. Career skills are enhanced through the interview process, resume writing, and administrative duties including; budgeting, medical and legal considerations and political issues affecting health care. Special emphasis is placed on research methods, medical law and ethics, and scheduling guidelines. Focus on basic measures necessary to provide quality patient care. Basic principles of record keeping and maintaining confidentiality of information are explained.

AHT 315 | MANAGEMENT AND METHODS OF PATIENT CARE II | 2 quarter hours

(Undergraduate)

Skills in problem solving, critical-thinking, and decision-making are developed as well as oral and written communication skills. Career skills are enhanced through the interview process, resume writing, and administrative duties including budgeting, medical and legal considerations and political issues affecting health care. Special emphasis is placed on research methods, medical law and ethics, and scheduling guidelines. Focus on basic measures necessary to provide quality patient care. Basic principles of record keeping and maintaining confidentiality of information are explained. (2 quarter hours)

AHT 316 | RADIATION BIOLOGY | 1 quarter hour

(Undergraduate)

Knowledge of cell structure and function as a basis for understanding cellular and organ responses to the effects of ionizing radiation, radionuclides and radiation oncology. Understanding units of exposure, organ dose calculation and body distribution. (1 quarter hour)

AHT 317 | MEDICAL TERMINOLOGY | 1 quarter hour

(Undergraduate)

The medical terminology course consists of a study of root words, prefixes, and suffixes of medical vocabulary. Also included are medical abbreviations and applicable symbols. A combination of learning exercises and chapter quizzes are utilized. Emphasis is on application of terminology through the use of chapter objectives, learning exercises, and critical thinking exercises. As an independent study, students may choose to progress more rapidly than the assignment schedule outlines. (1 quarter hour)

AHT 321 | MANAGEMENT AND METHODS PATIENT CARE | 2 quarter hours

(Undergraduate)

Content is designed to provide the student with foundational concepts and competencies in assessment and evaluation of the patient for service delivery. Psychological and physical needs and factors affecting treatment outcome will be presented and examined. Students will also get a better understanding of how race, gender, physical ability, sexual orientation, spirituality, healing and dying, and age play a role in cultural competence. Routine and emergency care procedures will be presented. Course will also include an orientation to hyperthermia, chemotherapy, body mechanics, nutrition for cancer patients, and an overview of radiation therapy patient side effects. (2 quarter hours)

**AHT 322 | QUALITY MANAGEMENT | 2 quarter hours
(Undergraduate)**

Content is designed to focus on the evolution of quality management (QM) programs and continuing quality improvement in radiation oncology. Topics will include the need for quality assurance (QA) checks; QA of the clinical aspects and chart checks, film checks; the various types of evaluations and tests performed on simulators, megavoltage therapy equipment, and therapy planning units; the role of radiation therapists in quality management programs; legal and regulatory implications for maintaining appropriate guidelines; and the role computers and information systems serve within the radiation oncology department. (2 quarter hours)

**AHT 323 | CLINICAL PRACTICUM I | 2 quarter hours
(Undergraduate)**

The overall objective of this course is to aid the student in achieving basic level technical skills through supervised practice of radiation therapy procedures on actual patients. Students will be required to complete some ARRT required clinical competency examinations during this course. (2 quarter hours)

**AHT 324 | CLINICAL PRACTICUM II | 2 quarter hours
(Undergraduate)**

The overall objective of this course is to aid the student in achieving basic level technical skills through supervised practice of radiation therapy procedures on actual patients. This is a continuation of Clinical Practicum I. Students will be required to complete all remaining ARRT required clinical competency examinations during this course. (2 quarter hours)

**AHT 325 | INTRODUCTION TO RADIOLOGIC SCIENCES | 2 quarter hours
(Undergraduate)**

This course provides the student therapist with the technical aspects of radiography equipment. Discussion will include orientation to the function and operation of radiography equipment. (2 quarter hours)

**AHT 326 | RADIATION BIOLOGY | 3 quarter hours
(Undergraduate)**

This course introduces the student to the effects of ionizing radiation and chemotherapeutic agents on living tissue. Emphasis is placed on the concept of the therapeutic ratio and the manipulation of influencing factors in order to affect patient treatment outcomes. (3 quarter hours)

**AHT 327 | RADIATION SAFETY AND PROTECTION | 3 quarter hours
(Undergraduate)**

The purpose of this course is to educate students regarding institutional, state and federal regulations controlling the safe use and disposal of radiation-producing equipment and sources. Emphasis is placed on ALARA principles to define the health professional's legal and ethical responsibility to minimize radiation dose to co-workers and patients, and oneself. (3 quarter hours)

**AHT 329 | PATHOLOGY | 3 quarter hours
(Undergraduate)**

This course introduces the student to the field of pathology with an emphasis on the oncologic disease processes. Topics range from discussion of pathology from the cellular level through various organ systems. Students are introduced to terminology related to the field of pathology as a whole and to the subspecialty of oncology specifically. (3 quarter hours)

**AHT 330 | RADIATION SAFETY AND PROTECTION | 3 quarter hours
(Undergraduate)**

Supervised practice and procedures for the receipt, handling, transporting, storage, usage, record keeping, disposal and decontamination of radioactive materials. Emphasis on licensing and regulations set forth by local, state and federal agencies. Academic and clinical instruction to provide the student with radiation safety techniques to minimize exposure to the patient, public, fellow workers and themselves. Regulations regarding therapeutic dosages and follow-up procedures. Focus on practical mathematics in nuclear medicine including radiation unit conversion, dose conversion, dose calculation, determination of specific activity, decay, and half-life calculation, counting efficiency, and statistics. (3 quarter hours)

**AHT 331 | RADIATION DETECTION AND INSTRUMENTATION | 3 quarter hours
(Undergraduate)**

Evaluation, maintenance and function of instrumentation used in imaging and in the laboratory. Principles and theory of PET/CT and scintillation camera operation and performance. Radiation measurement, event counting activity, pulse height spectra, detection efficiency, resolving time and statistics. Flood field and bar phantom use for assessing camera uniformity, relative sensitivity, spatial linearity and resolution testing. Quality assurance procedures for the PET scanner include radial, tangential and axial resolution, sensitivity, linearity, uniformity, attenuation accuracy, scatter determination and dead time corrections. Knowledge of the operations and maintenance of computer hardware and software. Emphasis on data collection, analysis and processing used in clinical imaging. Application of computer devices and memory usage. Emphasis on SPECT, SPECT/CT, PET and PET/CT quality control procedures. (3 quarter hours)

**AHT 332 | RADIATION PHYSICS AND INSTRUMENTATION | 3 quarter hours
(Undergraduate)**

Theory and physical principles associated with atomic structure, nuclear and quantum physics related to radioactive decay. Properties of the elements and the production of characteristic x and gamma rays, alpha electrons and Bremsstrahlung. Instruction on the modes of decay, radiation dosimetry, and interaction of ionizing radiation with matter. Basic physics, instrumentation, and radiochemistry of SPECT (Single Photon Emission Computed Tomography), SPECT/CT, Positron Emission Tomography (PET), and PET/CT. (3 quarter hours)

**AHT 333 | RADIONUCLIDE CHEMISTRY AND RADIOPHARMACY | 3 quarter hours
(Undergraduate)**

The chemical, physical and biological properties of radiopharmaceuticals used in diagnosis and therapy. Emphasis is given to the preparation, calculation, identification, administration, and disposal of radiopharmaceuticals. Performance of all radionuclide quality control and quality assurance procedures. Principles of decay and half-life, tissue localization, chemical impurities, generator systems, dose preparation and techniques of good laboratory practices and cell labeling. (3 quarter hours)

AHT 334 | CLINICAL CORRELATION - PATHOLOGY | 3 quarter hours (Undergraduate)

Focus on the study of the structure and function of human cells, tissues, organs and systems. Clinical interpretation of organ systems with emphasis on immunology, and anatomy and physiology, which will provide a basis for understanding abnormal or pathological conditions as applied to nuclear medicine. Causes, symptoms, and treatments of disease are discussed as well as their effect on the images. In addition, the student is scheduled to observe the interpretation of images with the physician staff. (3 quarter hours)

AHT 335 | COMPUTED TOMOGRAPHY AND CROSS-SECTIONAL ANATOMY | 3 quarter hours (Undergraduate)

Introduction to the fundamental concepts and principles of computed technology and its role in medical imaging. Specific topics include physics & instrumentation of CT scanning, image production, and cross-sectional anatomy of the head, neck, thorax, abdomen, and pelvis. Emphasis placed on patient considerations, patient safety, and radiation protection. (3 quarter hours)

AHT 341 | RADIATION PHYSICS I | 3 quarter hours (Undergraduate)

Students are introduced to the principles and practice of applying ionizing radiation to the human body. Topics include discussion of radiation therapy equipment, including treatment units and computer planning systems with an emphasis on how this equipment is used to produce proper treatment planning and dose calculations, according to the radiation oncologist's prescription. Topics also include fundamental concepts of general physics and radiation physics, including the production of x-rays interactions with matter. (3 quarter hours)

AHT 342 | RADIATION PHYSICS II | 3 quarter hours (Undergraduate)

Students are introduced to the principles and practice of applying ionizing radiation to the human body. Topics include discussion of radiation therapy equipment, including treatment units and computer planning systems with an emphasis on how this equipment is used to produce proper treatment planning and dose calculations, according to the radiation oncologist's prescription. Radiation protection and quality assurance will also be covered. This course is a continuation of Radiation Therapy Physics I. (3 quarter hours)

AHT 343 | MEDICAL IMAGING AND PROCESSING | 2 quarter hours (Undergraduate)

Procedure for imaging human structure and their relevance to radiation therapy; topographical anatomy, radiographic and cross sectional anatomy. Identification of anatomic structures as demonstrated through various imaging modalities. (2 quarter hours)

AHT 344 | OPERATION ISSUES IN RADIATION THERAPY | 3 quarter hours (Undergraduate)

Content is designed to focus on various allied health operational issues. Continuing Quality Improvement (CQI) project development, evaluation, and assessment techniques will be emphasized. Human resource issues and regulations impacting the radiation therapist will be examined. Accreditation agencies and the licensed practitioner's role in the accreditation process will be presented. Billing and reimbursement issues will be covered. (3 quarter hours)

AHT 345 | PRINCIPLES AND PRACTICE OF RADIATION THERAPY | 2 quarter hours (Undergraduate)

Content is designed to provide an overview of cancer and the specialty of radiation therapy. The medical, biological, and pathological aspect, as well as the physical and technical aspects, will be discussed. This course will also include content designed to provide the student with fundamental concepts, theories, and application of healthcare laws and ethical standards implemented and practiced in quality management for radiation therapy. Analysis of legal terminology, sources of law and the litigation process as applied to health professionals will be evaluated. (2 quarter hours)

AHT 346 | PRINCIPLE AND PRACTICE OF RADIATION THERAPY II | 2 quarter hours (Undergraduate)

This course is a continuation of principles and practice of radiation therapy I. Critical thinking and the basics of ethical and clinical decision making are fostered in the student. The epidemiology, etiology, detection, diagnosis, patient condition, treatment, and prognosis of neoplastic disease will be presented, discussed, and evaluated in the relationship to histology, anatomical site, and patterns of spread. The radiation therapist's responsibility in the management of neoplastic disease will be examined and linked to the skills required to analyze complex issues and make informed decisions while appreciating the character of the profession. (2 quarter hours)

AHT 347 | TECHNICAL RADIATION ONCOLOGY | 2 quarter hours (Undergraduate)

This course provides the student therapist with the technical aspects of radiation therapy. Discussion will include orientation to the function and operation of radiation therapy equipment. The clinical lab component of this course provides a hands-on, sequential application, and clinical integration of concepts and theories in the radiation therapy clinic and the didactic portion of this course. Concepts of team practice, patient-centered and clinical practice will also be discussed. (2 quarter hours)

AHT 348 | TECHNICAL RADIATION ONCOLOGY | 3 quarter hours (Undergraduate)

This course is designed to focus on discussions of various treatment and simulation procedures of 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. (3 quarter hours)

AHT 365 | URINE ANALYSIS AND BODY FLUIDS | 3 quarter hours (Undergraduate)

Body fluids such as urine, pleural, and spinal are examined to determine the kinds and numbers of body cells present. The students will master quantitative and qualitative testing of urine is done. This includes testing for pH, color, specific gravity, sugars and excessive amounts of protein. Urine and other body fluids are also examined for the presence of bacteria and parasites as well as crystals and casts formed by the kidneys.

AHT 371 | FUNDAMENTALS OF CLINICAL CHEMISTRY | 1 quarter hour (Undergraduate)

This course presents the development of fundamental laboratory skills laboratory operations and automation in a lecture format.

AHT 372 | APPLICATIONS OF CLINICAL CHEMISTRY | 3 quarter hours (Undergraduate)

This course in the clinical laboratory pertains to the acquisition of manual and automated laboratory skills to test patient samples utilizing complex instrumentation and understanding the principals of test procedures, instrumentation, quality control and approved safety practices. 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.

AHT 373 | ADVANCED APPLICATIONS OF CLINICAL CHEMISTRY | 5 quarter hours (Undergraduate)

This is a lecture course presenting in depth theory, pathophysiology, and high level of problem solving commonly seen in the laboratory. This didactic portion of the program is presented by pathologists, PhD scientists and experienced Medical Laboratory Scientists.

AHT 374 | FUNDAMENTALS OF HEMATOLOGY | 1 quarter hour (Undergraduate)

This laboratory develops fundamental laboratory skills in Hematology. This experience includes lecture presentations, demonstrations, clinical observations and hands-on practical experience. Students learn to prepare and stain peripheral blood smears in preparation for counting and classification of the various types of red and white blood cells among other labs.

AHT 375 | CLINICAL HEMATOLOGY AND COAGULATION | 4 quarter hours (Undergraduate)

In the Clinical Hematology Laboratory students will master blood counts and cellular classification. 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. 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.

AHT 376 | ADVANCED APPLICATIONS IN HEMATOLOGY AND COAGULATION | 4 quarter hours (Undergraduate)

This is a lecture course presenting in depth theory, pathophysiology, and high level of problem solving commonly seen in the laboratory. This didactic portion of the program is presented by pathologists, PhD scientists and experienced Medical Laboratory Scientists.

AHT 378 | FUNDAMENTALS OF CLINICAL MICROBIOLOGY | 1 quarter hour (Undergraduate)

The Microbiology Laboratory deals with the isolation and identification of 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. Bacteriology is concerned with the various bacteria that may cause direct destruction of tissue or harmful sequelae. Throat, urine, stool, blood, wound and sputum cultures are some of the types of specimens received for processing.

AHT 379 | CLINICAL MICROBIOLOGY | 4 quarter hours (Undergraduate)

This course presents an ideal learning environment for the development of fundamental laboratory skills in Clinical Microbiology. This experience includes lecture presentations, demonstrations, clinical observations and hands-on practical experience. In this introductory student microbiology laboratory course, students learn to prepare and stain gram smears in order to identify microorganisms. The students will learn to prepare and read culture plates.

AHT 380 | ADVANCED APPLICATION OF MICROBIOLOGY | 5 quarter hours (Undergraduate)

This is a lecture course presenting in depth theory, pathophysiology, and high level of problem solving commonly seen in the laboratory. This didactic portion of the program is presented by pathologists, PhD scientists and experienced Medical Laboratory Scientists.

AHT 381 | APPLICATIONS OF CLINICAL VIROLOGY | 1 quarter hour (Undergraduate)

Virology course approaches the study of viruses and isolating viruses such as influenza, chicken pox, cytomegalovirus, and herpes from clinical specimens utilizing advanced molecular techniques. Students will learn to perform these routine methods and procedures commonly used identify these and other viruses. Highly sensitive nucleic acid amplification methods, including real-time PCR, are used to detect low concentrations of infectious agents such as Herpes simplex. Quantitative (viral load) tests for hepatitis C and HIV nucleic acid are used to monitor response to therapy. Analysis of mutated genes is performed to evaluate patients with clotting disorders, and clonal gene rearrangement studies are used in the diagnosis of lymphomas.

AHT 382 | PARASITOLOGY | 1 quarter hour (Undergraduate)

In the Parasitology course, specimens are examined for the presence of amoebae, malarial organisms, worms and their ova, and flagellates. Larger parasites, such as mites, fleas or ticks are also identified so the appropriate disease diagnosis can be made, treatment started, and public health concerns addressed.

AHT 383 | MYCOLOGY | 1 quarter hour (Undergraduate)

Mycology deals with fungi that may infect man on the surface of the skin (i.e., ringworm) or cause systemic complications (i.e., histoplasmosis). Mycobacteriology is the study of such organisms as that which causes tuberculosis.

AHT 384 | FUNDAMENTALS OF IMMUNOHEMATOLOGY | 1 quarter hour (Undergraduate)

The student will master the techniques of ABO blood grouping methods, Rh testing, crossmatching and identification of red blood cell antibodies. In addition, the student learns about the preparation and use of blood components and observes blood collection procedures including whole blood and apheresis donations, as well as hematopoietic progenitor cell collection. Blood bank activities require close coordination with the clinical care units, so students in this laboratory have a sense of direct involvement in patient care.

AHT 385 | FUNDAMENTALS OF IMMUNOHEMATOLOGY AND TRANSFUSION MEDICINE | 4 quarter hours

(Undergraduate)

This basic laboratory course presents the development of fundamental laboratory skills in blood banking and transfusion medicine. This experience includes lecture presentations, demonstrations, clinical observations and hands-on practical experience. During the blood bank laboratory course, the student will master ABO & Rh phenotyping, the indirect antiglobulin test and identify simple red blood cell antibodies. Immediate spin and indirect antiglobulin crossmatch techniques are also learned.

AHT 386 | ADVANCED APPLICATIONS OF IMMUNOHEMATOLOGY | 3 quarter hours

(Undergraduate)

This is a lecture course presenting in depth theory, pathophysiology, and high level of problem solving commonly seen in the laboratory. This didactic portion of the program is presented by pathologists, PhD scientists and experienced Medical Laboratory Scientists.

AHT 387 | FUNDAMENTALS OF IMMUNOPATHOLOGY | 1 quarter hour

(Undergraduate)

This basic laboratory course presents an ideal learning environment for the development of fundamental laboratory skills in Immunology and serology. This experience includes lecture presentations, demonstrations, clinical observations and hands-on practical experience.

AHT 388 | CLINICAL IMMUNOPATHOLOGY | 2 quarter hours

(Undergraduate)

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.

AHT 389 | ADVANCED APPLICATION OF IMMUNOPATHOLOGY | 1 quarter hour

(Undergraduate)

This is a lecture course presenting in depth theory, pathophysiology, and high level of problem solving commonly seen in the laboratory. This didactic portion of the program is presented by pathologists, PhD scientists and experienced Medical Laboratory Scientists.