

Respiratory Care and Diagnostic Science

The Department of Respiratory Care and Diagnostic Science offers the following campus and online degree and certificate programs:

Bachelor of Science - Respiratory Care Programs

- **Bachelor of Science - KUMC Campus:** KUMC campus-based program provides the required curriculum for students who wish to enter the profession of respiratory care and work as a respiratory therapist.
- **Bachelor of Science - Degree Advancement (Online):** Program available for students who have already earned an associate degree and the RRT credential and wish to complete a bachelor's degree in respiratory care.
 - **Concurrent Enrollment Option:** Students currently enrolled in a regionally accredited AS/AAS degree respiratory care program may be eligible to concurrently take up to 9 credit hours toward the bachelor's degree advancement program.
- **Bachelor of Science - International Degree Advancement (Online):** Program available for international students who live and work outside the United States as respiratory therapists or healthcare providers who specialize in care of respiratory care delivery.

Bachelor of Science in Diagnostic Science

- **General Diagnostic Science:** Curriculum is designed for students who have previously completed an AS degree in imaging and wish to complete a professional advancement bachelor's degree that focuses on leadership, management, simulation, population and global health, and advanced understanding of healthcare systems and disease management.
- **Cardiovascular Sonography Concentration:** Curriculum prepares students to credential in adult echocardiography and either pediatric echocardiography or vascular technology.
- **Diagnostic Ultrasound and Vascular Technology Concentration:** Curriculum focused on abdominal, obstetric and gynecological sonography, and vascular technology prepares students to become Registered Diagnostic Medical Sonographers and Registered Vascular Technologists.
- **Nuclear Medicine Technology Concentration:** Curriculum prepares students to safely and properly use radiopharmaceuticals and use highly technical cameras and computers while preparing for national registry exams.

Certificates in Diagnostic Science

Applicants that meet admission qualifications can elect to complete a certificate only in Cardiovascular Sonography or Diagnostic Ultrasound and Vascular Technology.

- **Cardiovascular Sonography Certificate:** Curriculum prepares students to credential in adult echocardiography and either pediatric echocardiography or vascular technology.
- **Diagnostic Ultrasound and Vascular Technology Certificate:** Curriculum focused on abdominal, obstetric and

gynecological sonography, and vascular technology prepares students to become Registered Diagnostic Medical Sonographers and Registered Vascular Technologists.

The Department of Respiratory Care and Diagnostic Science is a part of the School of Health Professions (<http://healthprofessions.kumc.edu/>) on the medical center campus of the University of Kansas. KU Medical Center (<http://www.kumc.edu/>) is located in the heart of the Kansas City metropolitan area at 39th and Rainbow Boulevard – about 40 minutes away from the main KU campus (<http://www.ku.edu/>) in Lawrence, Kansas.

Courses

CVS 300. Patient Care I. 1 Credits.

This course will demonstrate the knowledge and application of ergonomic techniques, types and methods of infection control, and proper patient care. The student will learn the roles and responsibilities of healthcare professionals to effectively communicate and collaborate in the healthcare environment. Upon completion of the course, the student will demonstrate knowledge of medical ethics and laws, quality control and improvement programs, and awareness of resources for professional development. Prerequisite: Admission to the cardiovascular sonography program.

CVS 305. Physics I. 2 Credits.

This course is designed to introduce the student to the fundamental physical principles of sonography and their application to various types of sonographic examinations. The course will introduce the basic physical principles of sound waves, hemodynamics, and Doppler ultrasound. The course will also review mathematical relationships that will be applied to the physics of ultrasound imaging. Prerequisite: Admission to the cardiovascular sonography program.

CVS 310. Adult Echocardiography I. 3 Credits.

This course is designed to enable the student to understand the hemodynamics and physiology of normal cardiac function. The course will include normal anatomy, flow patterns and pressures throughout the heart, principles of hemodynamics as it applies to the cardiovascular system, evaluation of systolic and diastolic function, and how to assess these parameters effectively and accurately by an echocardiogram. Prerequisite: Admission to the cardiovascular sonography program.

CVS 315. Clinical Practicum I. 6 Credits.

The purpose of the course is to provide well-balanced clinical education through hands on application in both the scanning lab and various clinical settings. Clinical Practicum I will focus on the development of image recognition, anatomy identification, acquisition of two-dimensional imaging, two-dimensional and m- mode measurements, and calculation of fractional shortening and ejection fraction. Prerequisite: Admission to the cardiovascular sonography program.

CVS 320. Physics II. 2 Credits.

This course is designed to further develop the student's knowledge of the physical principles and instrumentation involved in diagnostic medical sonography. The course will build upon the student's knowledge of the physical principles of 2-dimensional imaging, real time imaging, and pulsed-echo instrumentation. The student will also further their understanding of machine instrumentation including displays and image processing, and the role of dynamic range and harmonics. Lastly, students will gain an understanding of the importance of quality assurance and the potential for bioeffects. Prerequisite: Completion of CVS 305.

CVS 325. Adult Echocardiography II. 3 Credits.

This course is designed to enable the student to understand the hemodynamics and physiology of valvular heart disease. This will include signs, symptoms and common echocardiographic findings

associated with valvular heart disease as well as common treatment options and post-operative evaluation. Assessment of pericardial disease, including etiologies, signs & symptoms, and diagnostic Doppler criteria. Understanding the pathophysiology and echocardiographic findings associated with hypertensive heart and pulmonary hypertension. As well as introduction to some lesser seen cardiac conditions including cardiac masses and disease of the aortic. The role of two-dimensional, m-mode, color and spectral doppler evaluation for various disease states will be discussed. The student will learn to utilize echocardiography to effectively evaluate and quantify the effects of these disease states on the hearts structure, hemodynamics, and ability to effectively function. Prerequisite: Completion of CVS 310.

CVS 330. Congenital Heart Disease. 2 Credits.

This course will be an introduction to the evaluation of congenital heart disease via the segmental anatomy approach. Topics will include cardiac anatomic variants, physiology of specific lesions, palliative and surgical repairs, and adult congenital echo. Standard pediatric echo windows and techniques will be introduced via case studies and image reviews. Prerequisite: Completion of CVS 310.

CVS 335. Clinical Practicum II. 8 Credits.

The purpose of the course is to provide well-balanced clinical education through hands on application in both the scanning lab and various clinical settings. Clinical Practicum II will focus on the application of color, spectral and continuous wave Doppler skills to evaluate various pathological conditions. Students will further their proficiency in two-dimensional and m-mode scanning. Prerequisite: Completion of CVS 315.

CVS 340. EKG I. 1 Credits.

This course is designed to introduce the student to the fundamentals of an electrocardiogram (EKG). The student will be introduced to basic EKG principles, including those rhythms commonly encountered in the echocardiography lab. Prerequisite: Completion of Semester I and II.

CVS 345. Adult Echocardiography III. 3 Credits.

This course is designed to enable the student to understand the pathophysiology and echocardiographic findings associated with cardiomyopathies, and systemic diseases, as well as advanced heart failure therapies utilized to treat these conditions including cardiac transplantation. The etiology, physiology, cardiac auscultation, physical examination, symptoms, and EKG findings associated with the various disease states will be covered, as well as the role of two-dimensional, M-mode, color flow and spectral Doppler in the evaluation of these various disease states will be discussed. The course will also discuss advanced techniques and procedures utilized is diagnostic echocardiographic exams including three-dimensional imaging, myocardial strain and speckle tracking, and intracardiac echo. Prerequisite: CVS 310 and CVS 325.

CVS 350. Clinical Practicum III. 4 Credits.

The purpose of the course is to provide well-balanced clinical education through hands on application in both the scanning lab and various clinical settings. This course is designed to advance the student's clinical skills learned in previous clinical practicum courses. The focus of this course will be adult echocardiography and vascular ultrasound or adult echocardiography and pediatric echocardiography. Prerequisite: Completion of CVS 315 and CVS 335.

CVS 400. Vascular Ultrasound I. 4 Credits.

In this course the student will demonstrate knowledge of upper and lower extremity arterial anatomy and disease processes, demonstrate the ability to identify abnormal arterial waveforms and calculate the percent of stenosis. The student will learn upper and lower extremity venous anatomy and abnormal venous disease processes and the difference

between acute versus chronic deep venous thrombosis. Prerequisite: Completion of fall semester I, spring semester I, and summer semester I.

CVS 410. Pediatric Echocardiography I. 4 Credits.

In this course congenital heart disease will be examined via the segmental anatomy approach. Embryology, the normal fetal and postnatal heart and their circulations, hemodynamics, scanning views and techniques, congenital and acquired cardiac pathology and their related sequelae will be investigated. Emphasis will be placed on defect anatomy and hemodynamic consequences and the surgical repair or other treatment options associated with each anomaly will be considered. Recognition of congenital pathology and the development of critical thinking skills to correlate patient history, clinical information, echo findings, and related imaging results to formulate a differential diagnosis will be demonstrated upon completion of the course. Case studies and image reviews will allow the students to build upon their acquired knowledge and skillset. Prerequisite: Completion of fall semester I, spring semester I, and summer semester I.

CVS 420. Clinical Practicum IV. 8 Credits.

The purpose of the course is to provide well-balanced clinical education through hands on application in both the scanning lab and various clinical settings. This course is designed to advance the student's clinical skills learned in previous clinical practicum courses. The focus of this course will be adult echocardiography and vascular ultrasound or adult echocardiography and pediatric echocardiography. Prerequisite: Completion of CVS 315, 335, and 350.

CVS 430. Vascular Ultrasound II. 4 Credits.

In this course the student will demonstrate knowledge of the abdominal aorta and iliac arteries, renal vasculature, and visceral vasculature and their disease processes. The student will obtain the ability to identify abnormal arterial waveforms and calculate the percent of stenosis. The student will demonstrate knowledge in alternative testing modalities and how they may benefit the patient vs. ultrasound. Prerequisite: CVS 400.

CVS 440. Pediatric Echocardiography II. 4 Credits.

This course will build upon the content learned in Pediatric Echocardiography I (CVS 410) and will continue to expose the student to congenital heart disease. Congenital pathology, physiology and quantitative methods used in pediatric echo will be demonstrated and emphasized. Scanning, case studies and image review will allow the student to build upon their acquired knowledge and skillset. Prerequisite: CVS 410.

CVS 450. Clinical Practicum V. 8 Credits.

The purpose of the course is to provide well-balanced clinical education through hands on application in both the scanning lab and various clinical settings. This course is designed to advance the student's clinical skills learned in previous clinical practicum courses. The focus of this course will be adult echocardiography and vascular ultrasound or adult echocardiography and pediatric echocardiography. Prerequisite: Completion of CVS 315, 335, 350, and 420.

Courses

DXSC 450. Chronic Disease Diagnosis and Management. 3 Credits.

This course is open only to online students. The students will explore various trends that are contributing the multi-disciplinary diagnosis and management of chronic diseases patient care. Topics covered in this course include diagnosis and management of respiratory and other chronic disease conditions that may lead to medical imaging, cardiopulmonary exercise testing, pulmonary rehabilitation, home care, elderly care, nutritional care of the pulmonary patient, and communication skills necessary for patient education. Students in this course will gain an

understanding of how they can contribute to an inter-professional team in order to provide safe and effective patient care. Presentation of topics in this course may include lecture, group work/discussion, audiovisual, computer and other multimedia aids.

DXSC 480. Simulation and Interprofessional Education (IPE). 3 Credits.

This introductory course is designed for health care students to learn key concepts of building and leading a collaborative health care team. The course addresses both the clinical and behavioral aspects of performance with emphasis on interprofessional simulation-based education. The course is offered in a self-paced online format with a competency-based approach. The course will be taught over an eight-week period. The object of the course is to introduce collaborative practice for providing patient-centered care. The student will be introduced to: Interprofessional education and collaborative practice terminology Core Competencies for Interprofessional Collaborative Practice Foundations of effective health care teamwork Leading a collaborative health care team Skills to develop and implement simulation-based education. Prerequisite: Enrollment in Diagnostic Science Degree Advancement.

DXSC 495. Management, Ethics, and Law in Healthcare. 3 Credits.

This course is only open to online students. This course provides an overview of fundamental concepts in healthcare management, law, and ethics. Students will learn the skills and knowledge necessary to be successful in management leadership, management design, and managing diversity. Ethical concerns relevant to the healthcare manager will be addressed. Current and historical controversies in healthcare will be discussed. Upon completion of this course, students will have the knowledge to understand laws, ethics, and management principles of the complex healthcare landscape. Prerequisite: Enrollment in the Diagnostic Science BS DA.

DXSC 500. Imaging Modality Exploration and Correlation. 3 Credits.

This course will explore various imaging modalities and their roles in healthcare. General imaging concepts and correlations will be discussed. Prerequisite: Enrolled in Diagnostic Science BS DA.

DXSC 620. Community and Global Health. 3 Credits.

This course will explore a wide variety of major health issues that impact us as global citizens. Students will be exposed to an overview of challenges that face the world today as they learn about strategies and programs that promote health in a variety of settings. Through this course, students will become more culturally competent healthcare providers. They will learn about disparities related to ethnicity, socioeconomic issues, human rights, and resource limits as they relate to the health of populations. Prerequisite: Enrollment in Diagnostic Science BS DA.

DXSC 630. Lean Management. 3 Credits.

Lean Management-This course will introduce students to lean management principles such as Lean Six Sigma in healthcare. Students will learn process improvement through lean management concepts which will prepare them for management positions. Prerequisite: Enrollment in the Diagnostic Science BS DA program.

DXSC 640. Professional Communication. 3 Credits.

Professional Communication-this course will provide students with the tools they need to communicate clearly and effectively which will prepare them for the working world and leadership. Students will learn how to have crucial conversations on how to address serious issues via written or verbal. Prerequisite: Enrollment in the Diagnostic Science BS DA program.

DXSC 650. Medical Writing & Research. 3 Credits.

This course is designed to introduce the student to the basics of health research and writing methods. Health care research is the necessary foundation for meaningful improvements in clinical practice. This course will make the health research and writing process accessible, manageable, and enjoyable for health care students. Prerequisite: Enrollment in Diagnostic Science BS DA.

DXSC 655. Leadership Management. 3 Credits.

The objective of this course is to prepare undergraduate students to become successful leaders in healthcare by viewing leadership competencies by studying relevant and contemporary skills in today's ever changing healthcare landscape. By the end of the course, students should have an understanding of how to approach complex leadership problems and comprehend them. Prerequisite: Enrollment in the Diagnostic Science BS DA program.

DXSC 665. Capstone Project. 6 Credits.

This course is designed to give the student the opportunity to develop a project that is professionally relevant. This project will allow the student to explore opportunities such as implementing process change, protocol creation, and curriculum development. The course is individualized to the students' intellectual interests and professional development. Prerequisite: Enrollment in the Diagnostic Science BS DA program and be in the final semester before graduation.

Courses

NMED 300. Introduction to Nuclear Medicine and Medical Law and Ethics for the Imaging Professional. 3 Credits.

An introductory overview of the field of nuclear medicine technology with includes medical terminology for clinical nuclear medicine, patient and nursing skills including phlebotomy and vital signs, departmental organization and function, and a basic overview of applied mathematical and statistical analysis used in clinical nuclear medicine. This course will also introduce to the imaging profession the legal aspects to patient care regarding patient rights, ethical theories, risk management, quality patient care. The student will participate in group discussion. Prerequisite: Acceptance into the Nuclear Medicine Training Program

NMED 310. Nuclear Chemistry and Physics. 3 Credits.

This course is designed to present the theories of nuclear chemistry and physics including theory of Bohr's atom, radiation production, decay, physical half life and interaction with matter, chemical reactions and equations, review of periodic chart of elements and trilinear chart of nuclides. Prerequisite: College Physics and College Chemistry along with acceptance into the Nuclear Medicine Training Program

NMED 320. Radiopharmacy I. 2 Credits.

This course is designed to present the aspects of radiopharmaceuticals including safety and handling, methods of localization, pharmacology, dose calculation and record keeping, methods of production, and quality control. The course will begin to identify the clinical uses of radiopharmaceuticals as this course will be a prerequisite for Radiopharmacy II. Prerequisite: Acceptance into the Nuclear Medicine Training Program

NMED 330. Clinical Procedures Lab I. 2 Credits.

This course is taught in modules corresponding to organ systems of the body from a technical point of view. Each module includes: review of anatomy and physiology, cross-sectional anatomy, clinical indications for nuclear imaging, nuclear imaging procedures, including radiopharmaceuticals for current clinical practices, image interpretation, and review. Prerequisite: Acceptance into the Nuclear Medicine Training Program.

NMED 340. Radiation Biology and Protection. 2 Credits.

This course is designed to provide the student with an understanding of the effects of radiation on the human body at the cellular, organ and whole body levels including late of effects of radiation exposure and the risk to benefits ratio. This course will provide the students with current federal and state regulations in regards to safe handling, disposal, record keeping, and licensing for the clinical use of radiation. Prerequisite: Acceptance into the Nuclear Medicine Training Program

NMED 350. Clinical Internship I. 1 Credits.

Through supervised learning situations in a clinical nuclear medicine imaging department the student will gain knowledge and be required to demonstrate competence in specific imaging of nuclear medicine procedures, radiopharmaceutical distribution, imaging instrumentation, patient safety, occupational safety, and quality control practices in the clinical setting. Prerequisite: Acceptance into the Nuclear Medicine Training Program

NMED 400. Nuclear Instrumentation & Quality Assurance. 3 Credits.

This course is designed to familiarize the students with basic non-imaging and imaging with nuclear medicine equipment in the clinic. This course will include basic principles of operation, system configuration and performance characteristics of Scintillation cameras and PET systems, computers and quality control and assurance as required by manufacturer and regulatory agencies. Prerequisite: Acceptance into the Nuclear Medicine Training Program.

NMED 420. Radiopharmacy II. 2 Credits.

This course is the advanced course to Radiopharmacy I. The students will have an understanding of the radiopharmaceuticals that are used in the clinical nuclear medicine department. This course will also cover monoclonal, polyclonal, peptides, PET, therapeutic radiopharmaceuticals, pharmacology, as well as advancement in research that is current on radiopharmaceuticals to be used in the nuclear clinical setting. Prerequisite: Radiopharmacy I

NMED 430. Clinical Procedures II. 3 Credits.

This course is taught in modules corresponding to organ systems of the body from a technical point of view. It also covers PET and CT. Each module includes: review of anatomy and physiology, cross-sectional anatomy, clinical indications for nuclear imaging, nuclear imaging procedures, including radiopharmaceuticals for current clinical practices, image interpretation and review. Prerequisite: Clinical Procedures I.

NMED 440. Clinical Internship II. 1 Credits.

Through supervised learning situations in a clinical nuclear medicine imaging department the student will gain knowledge and be required to demonstrate competence in specific imaging of nuclear medicine procedures, radiopharmaceutical distribution, imaging instrumentation, patient safety, occupational safety, and quality control practices in the clinical setting. Prerequisite: Clinical Internship I

NMED 450. Research Methods & Health Administration. 1 Credits.

This course is designed to familiarize the student in research methodology and advances in nuclear medicine for future developments. This course will also demonstrate the phases of research and research different divisions of the research cycle. The second portion of the class will familiarize the student with the administration techniques of health management. Health management will include billing, coding and budget and equipment selection processes of maintaining a nuclear medicine department. Prerequisite: Acceptance into the Nuclear Medicine Training Program.

NMED 455. Clinical Internship III. 5 Credits.

Through supervised learning situations in a clinical nuclear medicine imaging department the student will gain knowledge and be required to demonstrate competence in specific imaging of nuclear medicine procedures, radiopharmaceutical distribution, imaging instrumentation, patient safety, occupational safety, and quality control practices in the clinical setting. Prerequisite: Clinical Internship II

NMED 465. Advanced Clinical Procedures Lab. 3 Credits.

This course is taught in modules corresponding to organ systems of the body from a technical point of view. It covers advanced PET, CT and theranostics procedures. Each module includes in depth review of anatomy and physiology, cross-sectional anatomy, clinical indications for nuclear imaging, nuclear imaging procedures, including less common radiopharmaceuticals for current clinical practices, image interpretation and review. Prerequisite: Clinical Internship III.

NMED 480. Clinical Internship IV. 10 Credits.

Through supervised learning situations in a clinical nuclear medicine imaging department the student will gain knowledge and be required to demonstrate competence and proficiency in specific imaging of nuclear medicine procedures, radiopharmaceutical distribution, imaging instrumentation, patient safety, occupational safety, and quality control practices in the clinical setting. Prerequisite: Clinical Internship III.

NMED 490. Senior Seminar. 2 Credits.

This course is designed to prepare the student for national boards in the field of nuclear medicine technology. The instructor and student will be responsible for in-class review of nuclear clinical procedures, nuclear instrumentation and quality assurance, radiopharmacy, radiation protection, and patient care. Students will be required to attend guest lectures and video conferences. Prerequisite: Clinical Procedures I and II, Radiopharmacy I and II, Nuclear Instrumentation and Quality Assurance, Radiation Biology and Protection and Introduction to Nuclear Medicine

NMED 500. Clinical Internship V. 5 Credits.

Through supervised learning situations in a clinical nuclear medicine imaging department the student will gain knowledge and be required to demonstrate competence and proficiency in specific imaging of nuclear medicine procedures, radiopharmaceutical distribution, imaging instrumentation, patient safety, occupational safety, and quality control practices in the clinical setting. Prerequisite: Clinical Internship IV.

Courses

RESP 200. Introduction to Respiratory Therapy. 1 Credits.

This course is intended to be an introductory course for learners who are entering college-level health care programs or for those who believe they may be interested in pursuing a career in Respiratory Therapy. Topics are appropriate for professions that involve direct patient care, as well as those that provide support services. ****A permission number is required to enroll in RESP 200. Prerequisite: ****A permission number is required to enroll in RESP 200.

RESP 300. Introduction to Respiratory Care Procedures. 4 Credits.

An introductory course designed to acquaint the student with the fundamental theory, procedures, and equipment used in respiratory therapy. Emphasis is placed on understanding application of equipment and procedures to the patient, and the respiratory therapy treatment of patients requiring non-continuous ventilatory assistance. This course introduces such topics as cardiopulmonary resuscitation, bronchopulmonary hygiene, airway care, oxygen therapy, and cleaning and sterilization of equipment. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 301. Respiratory Care Evidence Based Practice. 2 Credits.

This course is designed to provide students with a basic introduction to healthcare research, with an emphasis on evidence-based practices. Students will refine their ability to identify a research question, conduct a literature search, review and critique a scientific article, and present the results of their literature review. This course will reinforce the students ability to articulate medical terminology from the cardiorespiratory sciences in the context of journal clubs. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 305. Cardiopulmonary Anatomy and Physiology. 2 Credits.

This course will introduce the student to normal anatomy and physiology of the cardiopulmonary systems. Students will focus on the etiology, and treatment of pulmonary and cardiac diseases, with emphasis on the pulmonary system.

RESP 306. Cardiopulmonary Pathophysiology. 2 Credits.

This course will introduce the student to normal cardiopulmonary systems, as well as, cardiopulmonary pathology. Students will focus on the etiology, pathophysiology, and treatment of pulmonary and cardiac diseases, with emphasis on the pulmonary system.

RESP 310. Clinical Pharmacology. 2 Credits.

This course will study the drugs administered to treat pulmonary disease. It will also include other classifications of drugs that have an effect on cardiopulmonary status. Areas will include drug calculations, indications, classification, proper dosage, modes of administration, the physiological actions of pharmacokinetics, pharmacodynamics, and pharmacokinetics, side effects, precautions, hazards, therapeutic effects and patient monitoring. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 315. Clinical Application I. 3 Credits.

This course introduces the beginning respiratory therapy student to the clinical environment. The student participates in clinically-oriented workshops, observation rotations, learning laboratory sessions, or simulations that focus on the application of respiratory therapy equipment, theory, patient management, and communication in the clinical setting. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 325. Mechanical Ventilation. 3 Credits.

Respiratory therapists have great responsibility in caring for acutely and chronically ill patients. This course will prepare students to initiate, manage and wean patients from artificial mechanical ventilation. It will also assist in developing the necessary critical thinking skills to make appropriate decisions and manage patient's ventilation and oxygenation status. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 326. Mechanical Ventilation Lab. 2 Credits.

This course contains such topics as arterial puncture, classification of mechanical ventilators and adjunct devices, and their application to the patient. 2 hour weekly laboratory acquainting the student with the rationale for continuous mechanical ventilation and the basic operation of adult, pediatric, and neonatal mechanical ventilators. Emphasis is placed on the selection of appropriate equipment and assessment of its effect on the patient. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 330. Cardiopulmonary Diagnostics and Data Interpretation. 2 Credits.

This lecture and laboratory course introduces students to key diagnostic tools and analytical methods used to evaluate respiratory and cardiovascular function. This course expands beyond traditional PFTs to encompass a wider range of cardiopulmonary assessments. Students will explore hemodynamic monitoring, electrocardiogram (EKG) interpretation, and additional diagnostic modalities commonly used in clinical practice. Emphasis is placed on accurate data interpretation, integration of diagnostic findings, and application of results to clinical decision-making. Through hands-on laboratory activities and case-based discussions,

students will build competencies necessary for interpreting complex cardiopulmonary data across diverse patient populations. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 335. Clinical Application II. 4 Credits.

This course provides the respiratory therapy student with an introduction to the critical care setting. The student will begin to apply the procedures and equipment most often utilized in the intensive care areas. Emphasis is placed on continuous mechanical ventilation, artificial airways, airway care, and bedside pulmonary function testing. The student will assume limited patient care responsibility in the critical care areas. Prerequisite: RESP 315.

RESP 340. Respiratory Review I. 1 Credits.

Respiratory Care Review- This course provides a complete review of the junior year respiratory care curriculum and aids in the preparation for students to take the Self-Assessment examination. Upon successful completion, students will be prepared to begin the senior year curriculum. Prerequisite: Successful completion of the first and second semesters of the respiratory care curriculum.

RESP 341. Respiratory Review II. 2 Credits.

Respiratory Care Review- "Junior Respiratory Care Review". This is the second of a two-course series that provides a complete review of the junior-year respiratory care curriculum and aids in preparing students to take the Self-Assessment examination. Upon successful completion, students will be prepared to begin the senior-year curriculum. Prerequisite: Successful completion of the first semester of the respiratory care curriculum.

RESP 345. Clinical Application 3. 3 Credits.

This course is a continuation of the clinical sequence that provides the respiratory therapy student with experience in the critical care setting. The student applies the procedures and equipment utilized by respiratory care practitioners in the intensive care areas. Emphasis is placed on continuous mechanical ventilation, artificial airways, airway care, and bedside diagnosis. The student assumes progressively more patient care responsibility in the critical care areas under preceptor supervision. Prerequisite: Completion of RESP 335.

RESP 350. Clinical Application (special). 1 Credits.

This course provides the intermediate respiratory therapy student with opportunities to practice basic respiratory therapy procedures. Emphasis placed on performance of respiratory therapy procedures and application of equipment. This course emphasizes such topics as oxygen therapy, aerosol therapy, incentive spirometry, patient assessment, and IPPB therapy. The student will assume limited patient care responsibilities.

RESP 375. Clinical Special. 0 Credits.

This course provides the advanced respiratory therapy student with opportunities to refine procedural and evaluative skills in the critical care areas. The student will spend a minimum of twenty-four hours per week in the clinical setting. Emphasis is placed upon the students ability to evaluate the patients' clinical situation and recommend appropriate therapy modalities to the clinical supervisor. During this course the student will assume wider-ranging patient care responsibilities.

RESP 399. Generalist Practice. 1 Credits.

This course is designed to allow students the opportunity to improve and perfect skills acquired in the junior year clinical courses. Emphasis will be given to refining the students' abilities to assess patient status and administer appropriate therapy modalities. This course may also be used to assess respiratory therapy knowledge and skills of students transferring from other programs. Prerequisite: Permission of instructor.

RESP 405. Advanced Critical Care. 1 Credits.

The respiratory and cardiovascular systems work together to maintain internal and external respiration. Many of the diseases and conditions that affect respiration are cardiovascular. The respiratory therapist plays a vital role in testing and monitoring all the body's cardiopulmonary tasks. Sometimes, the respiratory therapist will assist physicians and other times, they will test and monitor crucial functions on your own. This course will give students the knowledge and skills to handle cardiopulmonary patients. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 406. Advanced Critical Care Lab A/B. 2 Credits.

The respiratory and cardiovascular systems work together to maintain internal and external respiration. Many of the diseases and conditions that affect respiration are cardiovascular. The respiratory therapist plays a vital role in testing and monitoring all the body's cardiopulmonary tasks. Sometimes, the respiratory therapist will assist physicians and other times, they will test and monitor crucial functions on your own. This course will give students the knowledge and skills to handle cardiopulmonary patients. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 410. Neonatal Respiratory Care. 3 Credits.

This course is designed to provide the student with an introductory knowledge of fetal and newborn cardiorespiratory anatomy, physiology, development, pathophysiology, and care. Prerequisite: Senior year standing or permission of instructor.

RESP 411. Neonatal Respiratory Care Lab. 2 Credits.

This Course is designed to provide the student with an introductory knowledge of fetal and newborn cardiorespiratory anatomy, physiology, development, pathophysiology, and care in a lab setting. Prerequisite: Senior year standing.

RESP 415. Clinical Application IV. 4 Credits.

This course provides the advanced respiratory therapy student with opportunities to refine procedural and evaluative skills in the critical care areas. In the clinical setting emphasis is placed upon the student's ability to evaluate the patient's clinical situation and recommend appropriate therapy modalities to the clinical instructor. During this course the student will assume a progressively wider range of patient care responsibilities. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 420. Health Care Management, Ethics and Law. 2 Credits.

This course provides an overview of fundamental concepts in healthcare management, law, and ethics. Students will learn the skills and knowledge necessary to be successful in management leadership, management design, and managing diversity. Ethical concerns relevant to the healthcare manager will be addressed. Current and historical controversies in healthcare will be discussed. Upon completion of this course, students will have the knowledge to understand laws, ethics, and management principles of the complex healthcare landscape.

RESP 430. Pediatric Respiratory Care. 3 Credits.

This course focuses on the specialized respiratory care needs of infants and children across acute and chronic healthcare settings. Students will explore the physiological, developmental, and psychosocial differences that influence cardiopulmonary assessment and management in pediatric populations. Emphasis is placed on pediatric-specific respiratory diseases and disorders, mechanical ventilation strategies, airway management techniques, and oxygen therapy considerations unique to neonates and children. The course also integrates pediatric advanced life support (PALS) principles, enabling students to recognize and respond to respiratory and cardiac emergencies in pediatric clients. Through case-based learning and applied simulation, students will develop the competence and confidence required to deliver evidence-based, family-centered respiratory care to pediatric clients. Prerequisite: Enrolled in the bachelor's respiratory care program.

RESP 450. Chronic Respiratory Disease Management. 3 Credits.

This course is open only to online students. This course is an introduction to the evolving role of respiratory therapists in health care, especially in the area of chronic disease management. The students will explore various trends that are contributing to the role respiratory therapy may play in patient care. Topics covered in this course include COPD and asthma management, pulmonary rehabilitation, cardiopulmonary exercise testing, home care, elderly care, nutritional care of the pulmonary patient, and communication skills necessary for patient education. Students in this course will gain an understanding of how they can contribute to an inter-professional team in order to provide safe and effective patient care. Presentation of topics in this course may include lecture, group work/discussion, audiovisual, computer and other multimedia aids.

RESP 460. ACCS Specialty Credential Prep. 3 Credits.

This course will serve as review of material covered on the NBRC Matrix for the NBRC Adult Critical Care Specialty Examination. The purpose of this course is to guide students in the review and preparation for the NBRC ACCS Specialty Examination. This will include weekly covered content, as well as practice exams.

RESP 465. NPS Specialty Credential Prep. 3 Credits.

This course will serve as review of material covered on the NBRC Matrix for the NBRC Neonatal/Pediatric Specialty Examination. The purpose of this course is to guide students in the review and preparation for the NBRC NPS Specialty Examination. This will include weekly covered content, as well as practice exams.

RESP 470. AE-C Specialty Credential Prep. 3 Credits.

This course will provide an in-depth review of asthma education based on the National Asthma Educator Certification Board (NAECB) detailed content outline. Including the asthma condition, patient and family assessment, asthma management and organizational issues. Prerequisite: Enrollment in Respiratory Care.

RESP 480. Simulation and Interprofessional Education (IPE). 3 Credits.

This introductory course is designed for health care students to learn key concepts of building and leading a collaborative health care team. The course addresses both the clinical and behavioral aspects of performance with emphasis on interprofessional simulation-based education. The course is offered in a self-paced online format with a competency-based approach. The course will be taught over an eight-week period. The object of the course is to introduce collaborative practice for providing patient-centered care. The student will be introduced to: Interprofessional education and collaborative practice terminology Core Competencies for Interprofessional Collaborative Practice Foundations of effective health care teamwork Leading a collaborative health care team Skills to develop and implement simulation-based education. Prerequisite: Enrollment in Respiratory Care.

RESP 490. Special Studies or Projects. 1-9 Credits.

This course involves individual study, research or projects in the field of respiratory care under instructor guidance. Written reports and periodic conferences are required. Content and unit credit will be determined by student-instructor conferences and/or departmental conferences. This course may be repeated for a maximum of nine credits. Prerequisite: Admission to the respiratory care program and consent of instructor.

RESP 495. Management, Ethics, and Law in Respiratory Care. 3 Credits.

This course is only open to online students. This course provides an overview of fundamental concepts in healthcare management, law, and ethics. Students will learn the skills and knowledge necessary to be successful in management leadership, management design, and managing diversity. Ethical concerns relevant to the healthcare manager

will be addressed. Current and historical controversies in healthcare will be discussed. Upon completion of this course, students will have the knowledge to understand laws, ethics, and management principles of the complex healthcare landscape.

RESP 500. Respiratory Therapy Capstone: Community Involvement and Healthcare Promotion. 1 Credits.

In this capstone course, respiratory therapy students will integrate their knowledge and skills to engage with the community, educate others, and promote healthcare awareness. Through a combination of classroom instruction, hands-on experiences, community engagement, and clinical experiences, students will develop a comprehensive project aimed at addressing real-world respiratory therapy opportunities.

RESP 615. Respiratory Review III. 3 Credits.

This course will serve as review of all material covered in the NBRC matrix. The purpose of this course is to guide students in their review and preparation for the NBRC TMC and CSE exams. This will include weekly covered content as well as practice tests. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 620. Community and Global Health. 3 Credits.

This course will explore a wide variety of major health issues that impact us as global citizens. Students will be exposed to an overview of challenges that face the world today as they learn about strategies and programs that promote health in a variety of settings. Through this course, students will become more culturally competent healthcare providers. They will learn about disparities related to ethnicity, socioeconomic issues, human rights, and resource limits as they relate to the health of populations. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 625. Clinical Application V. 3 Credits.

This course provides the student with the opportunity to integrate clinical activities and responsibilities related to neonatal and pediatric respiratory care. Prerequisites: Enrolled in Respiratory Care Program.

RESP 630. Lean Management. 3 Credits.

Lean Management-This course will introduce students to lean management principles such as Lean Six Sigma in healthcare. Students will learn process improvement through lean management concepts which will prepare them for management positions. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 640. Professional Communication. 3 Credits.

Professional Communication-this course will provide students with the tools they need to communicate clearly and effectively which will prepare them for the working world and leadership. Students will learn how to have crucial conversations on how to address serious issues via written or verbal. Prerequisite: Enrollment in the Respiratory Care Program.

RESP 650. Medical Writing & Research. 3 Credits.

This course is designed to introduce the student to the basics of health research and writing methods. Health care research is the necessary foundation for meaningful improvements in clinical practice. This course will make the health research and writing process accessible, manageable, and enjoyable for health care students. Prerequisite: Enrollment in Respiratory Care.

RESP 655. Leadership Management. 3 Credits.

The objective of this course is to prepare undergraduate students to become successful leaders in healthcare by viewing leadership competencies by studying relevant and contemporary skills in today's ever changing healthcare landscape. By the end of the course, students should have an understanding of how to approach complex leadership problems and comprehend them. Prerequisite: Senior year standing or permission of the instructor.

RESP 665. Capstone Project. 6 Credits.

This course is designed to give the student the opportunity to develop a project that is professionally relevant. This project will allow the student to explore opportunities such as implementing process change, protocol creation, and curriculum development. The course is individualized to the students' intellectual interests and professional development. Prerequisite: 5 Core Courses (RESP 650, RESP 495, RESP 620, RESP 480, and RESP 450), 3 Track courses (RESP 460, RESP 470, RESP 465, RESP 630, RESP 640, RESP 655).

RESP 700. Advanced Cardiopulmonary Physiology. 3 Credits.

This course provides an advanced examination of human physiology with emphasis on cardiopulmonary function and its integration with other body systems. Students develop a comprehensive understanding of cellular and organ-level processes relevant to advanced respiratory care. Topics include membrane transport, ion channels and pumps, excitation-contraction coupling, calcium regulation, and mechanisms of oxidative cell damage and apoptosis. Organ-system physiology encompasses cardiovascular, respiratory, renal, water and electrolyte balance, gastrointestinal, endocrine, neuromuscular, and neurophysiologic processes. Learners apply advanced physiologic principles to complex clinical scenarios to support differential diagnosis, clinical reasoning, and evidence-based management of cardiopulmonary disorders. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 705. Advanced Pathophysiology. 3 Credits.

This course provides an advanced examination of the cellular, molecular, and systemic mechanisms underlying human disease. Content builds upon prior clinical education and professional experience to establish a strong scientific foundation for clinical application in advanced respiratory and perioperative care. Students analyze alterations in normal physiology, evaluate the progression of acute and chronic illness, and link pathologic processes to clinical manifestations and management strategies. Emphasis is placed on critical thinking and problem-solving related to best practices for caring for patients with complex pathophysiologic conditions, including considerations relevant to diagnostic evaluation, anesthetic planning, and therapeutic decision-making. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 710. Advanced Patient Assessment. 3 Credits.

This course prepares students to conduct comprehensive, systems-based evaluations using advanced interviewing and physical assessment skills. Learners integrate diagnostic findings, patient history, risk factors, and functional status to formulate prioritized problem lists and preliminary management plans. Special emphasis is placed on clinical reasoning, communication, cultural responsiveness, and assessment across diverse care settings. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 715. Advanced Pharmacology for Respiratory Care. 3 Credits.

This course provides advanced pharmacologic knowledge essential for managing complex cardiopulmonary conditions. Topics include general pharmacology principles, intravenous induction agents, inhalation anesthetics, opioid and non-opioid analgesics, autonomic nervous system pathways, G-protein mechanisms, cardiac pharmacology, and diuretics. Students develop the ability to analyze drug actions, anticipate interactions and adverse effects, and apply pharmacotherapy concepts to clinical decision-making in advanced respiratory and perioperative care. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 720. Evidence-Based Practice & Research Methods. 3 Credits.

This course introduces students to the principles and methods of evidence-based practice, research design, biostatistics, and critical appraisal. Learners evaluate scientific literature, interpret data, and translate evidence into clinical decision-making. The course prepares students to design a capstone or thesis project by developing problem statements, review strategies, methodological frameworks, and ethical considerations in clinical research. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 725. Health Policy, Leadership, and Ethics. 3 Credits.

Students examine health policy, leadership theory, organizational behavior, and ethical principles relevant to advanced respiratory practice. The course explores regulatory frameworks, APRT scope of practice, credentialing and reimbursement models, and the broader policy landscape influencing advanced practice roles. Ethical analysis, advocacy strategies, and interprofessional leadership competencies are emphasized through case-based application. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 730. Diagnostic & Therapeutic Procedures in APRT Practice. 2 Credits.

This course provides advanced instruction in diagnostic interpretation and therapeutic procedures performed by advanced practice respiratory therapists. Topics include imaging interpretation, pulmonary diagnostics, invasive and non-invasive monitoring, advanced airway management techniques, and therapeutic interventions used across acute and specialty care settings. Students integrate clinical findings with diagnostic data to guide evidence-based treatment decisions. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 735. APRT Residency I. 4 Credits.

This initial residency develops foundational APRT clinical competencies through supervised experiences in acute and specialty care settings. Students apply advanced assessment, diagnostic interpretation, and therapeutic management skills while demonstrating professional behaviors and emerging clinical autonomy. Structured feedback supports development of clinical reasoning and role identity as an advanced practice respiratory therapist. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 745. APRT Residency II. 6 Credits.

Students continue progression toward independent APRT practice through expanded clinical responsibilities and exposure to high-acuity and specialty environments. Emphasis is placed on complex patient management, interprofessional collaboration, and synthesis of diagnostic information. Learners demonstrate increasing autonomy in decision-making, procedural skills, and longitudinal management of diverse patient populations. Prerequisite: Admission to the KU Advanced Practice Respiratory Therapy Program.

RESP 750. Population Health & Chronic Disease Management. 3 Credits.

This course explores determinants of health, chronic respiratory disease management, health equity, and community-based models of care. Students evaluate population-level data, identify disparities, and design strategies to improve outcomes among diverse patient groups. Topics include care coordination, patient education, prevention, telehealth, and chronic disease self-management frameworks relevant to APRT practice. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 755. APRT Residency III. 7 Credits.

This advanced residency emphasizes management of complex clinical presentations and specialty rotations such as pulmonology, critical care, sleep medicine, and cardiology. Students demonstrate advanced procedural competence, refined diagnostic reasoning, and a high

level of clinical independence under supervision. Rotations integrate evidence-based practice, longitudinal care planning, and systems-based professional expectations. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 760. APRT Capstone/Thesis. 2 Credits.

Students complete an evidence-based capstone project or thesis addressing a clinically relevant problem in respiratory care. Under faculty guidance, learners conduct a literature review, implement appropriate methodology, analyze findings, and disseminate results. The course emphasizes scholarly inquiry, application of evidence to practice, and contribution to the advancement of the APRT profession. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

RESP 765. APRT Residency IV. 4 Credits.

In this final residency, students demonstrate readiness for independent APRT practice through comprehensive management of complex patient cases and advanced procedural responsibilities. Learners refine leadership, communication, and autonomous decision-making skills while integrating clinical, academic, and professional competencies. Completion of this residency signifies preparedness for transition into advanced practice roles. Prerequisite: Admission into the KU Advanced Practice Respiratory Therapy Program.

Courses

UTEC 300. Foundations of Sonography. 1 Credits.

An introductory overview of the field of Diagnostic Ultrasound encompassing medical terminology for the sonographer, departmental function, ergonomics, patient care, and ethical issues in health care. Prerequisite: Acceptance into the Diagnostic Ultrasound Technology Program.

UTEC 305. Sectional Anatomy. 2 Credits.

This course is designed to introduce a sectional approach to anatomical structures and increase understanding of three-dimensional relationships of normal anatomy. Prerequisite: Acceptance into the Diagnostic Ultrasound Program.

UTEC 310. Sonography Principles and Instrumentation I. 2 Credits.

This course is designed to introduce the students to the basic terminology, the principles of propagation, beams and transducers and possible biological effects. Prerequisite: College Physics along with acceptance into the Diagnostic Ultrasound Technology Program.

UTEC 315. Sonography Principles and Instrumentation II. 2 Credits.

This course is designed to educate the student on advanced areas of ultrasonic propagation principles, transducer parameters, instrumentation, interactive properties with tissues, possible biological effects and quality control procedures. Introduction to Color and Spectral Doppler is included. Prerequisite: Sonography Principles and Instrumentation I.

UTEC 320. Abdominal I Sonography. 2 Credits.

This course is designed to present and review abdominal cross-sectional and introduce renal anatomy, physiology, pathology, and the associated sonographic appearances. This includes clinical indications for the ultrasound of the kidneys along with sonographic appearances of normal and disease processes with instrumentation, technique, and protocols. Prerequisite: College Anatomy and Physiology along with acceptance into the Diagnostic Ultrasound Technology Program.

UTEC 325. Abdominal Sonography II. 2 Credits.

This course is taught in sections corresponding to abdominal organs and compartments imaged in the abdomen. This course provides instruction in Liver, Biliary, Pancreas, and Spleen. Each section includes: review

of anatomy, physiology, pathology, clinical indications for sonography, sonographic appearances of normal and disease processes, along with instrumentation, technique and protocols. Abdominal Doppler of normal, diseased, and transplanted liver and pancreas will be included. Prerequisite: Abdominal Sonography I.

UTEC 330. Gynecologic Sonography. 2 Credits.

This course is designed to educate the student on gynecologic anatomy, physiology, pathology and the sonographic appearances. This includes clinical indications for ultrasound along with instrumentation, technique, and protocols. Prerequisite: College Anatomy and Physiology along with acceptance into the Diagnostic Ultrasound Technology Program.

UTEC 335. Obstetrical Sonography. 3 Credits.

This course is designed to educate the student on normal maternal changes and fetal development throughout gestation. Embryonic and fetal anatomy, anomalies, pathology, biometry, and the sonographic appearances are reviewed. Instrumentation, technique, and protocols are studied. Prerequisite: Gynecologic Sonography and College Anatomy and Physiology.

UTEC 340. Clinical Internship I. 4 Credits.

Through supervised clinical experience in an ultrasound imaging department, the student will gain knowledge and be required to demonstrate competence in abdominal and gynecologic clinical imaging and instrumentation. Prerequisite: Acceptance into the Diagnostic Ultrasound Technology Program.

UTEC 345. Clinical Internship II. 4 Credits.

Through supervised clinical experience in an ultrasound imaging department and perinatology department the student will gain knowledge and be required to demonstrate competence in gynecologic, obstetrical, small parts and abdominal clinical imaging and instrumentation including Color and Spectral Doppler evaluation. Prerequisite: Gynecologic Sonography and Abdominal Sonography I.

UTEC 350. Superficial Structures Sonography. 2 Credits.

This course is taught in sections corresponding to superficial structures of the body. This course provides instruction in thyroid, scrotal, breast, soft tissue, and musculoskeletal sonography. The sections include: a review of anatomy, physiology, and pathology, clinical indications for sonography, sonographic appearances of normal and disease processes, along with instrumentation, technique, and protocols.

UTEC 380. Sonography Scanning Techniques I. 2 Credits.

This course introduces concepts of sonographic evaluation including grayscale and Doppler of the abdomen and female pelvis. Students will perform basic scanning procedures and familiarize themselves with anatomy. Prerequisite: College Anatomy and Physiology along with acceptance into the Diagnostic Ultrasound Program.

UTEC 385. Sonography Scanning Techniques II. 2 Credits.

Laboratory demonstration and student performance of standard protocols for superficial structures, abdomen and OB/GYN sonography, with emphasis on normal anatomy and pattern recognition. Students will perform basic scanning procedures and familiarize themselves with anatomy. Prerequisite: Gynecologic Sonography and Abdominal Sonography I.

UTEC 410. Vascular Technology I. 1 Credits.

This course is taught in sections corresponding to selected sites in the vascular system. Each section includes review of: anatomy, physiology, pathology, and clinical indications for noninvasive vascular imaging and disease processes. Instrumentation, technique, and protocols are included. Prerequisite: Advanced Sonography Principles and Instrumentation II and Abdominal Sonography I.

UTEC 415. Vascular Technology II. 2 Credits.

This course is taught in sections corresponding to selected sites in the vascular system. Each section includes review of: anatomy, physiology, pathology, and clinical indications for noninvasive vascular imaging and disease processes. Instrumentation, technique, and protocols are included. Prerequisite: Vascular Technology I, Sonography Principles and Instrumentation I and II, and Abdominal Sonography I, II, and III.

UTEC 420. Abdominal Sonography III. 1 Credits.

This course is taught in sections corresponding to abdominal organs and compartments imaged in the abdomen. This course provides instruction in the Retroperitoneum, Peritoneum, Gastrointestinal, Abdominal Wall, and Great Vessels. Each section includes: review of anatomy, physiology, pathology, clinical indications for sonography, sonographic appearances of normal and disease processes, along with instrumentation, technique, and protocols. Prerequisite: Abdominal Sonography I and II.

UTEC 430. Advanced Sonography Seminar I. 2 Credits.

This course is designed to prepare the student for national board examinations administered by the American Registry of Diagnostic Medical Sonographers in the field of ultrasound and vascular technology. The student will be responsible for review of ultrasound clinical procedures, including anatomy, physiology, disease processes and sonographic appearances, and sonography principles and instrumentation. In addition, the student will learn post graduate skills to enhance professional opportunities. Prerequisite: Gynecologic, Sonography Small Parts, Obstetrical Sonography, and Abdominal Sonography I, II, and III, Clinical Internship I, II, and III, and Sonography Principles and Instrumentation I and II.

UTEC 435. Advanced Sonography Seminar II. 3 Credits.

This course is designed to prepare the student for national boards administered by the American Registry of Diagnostic Medical Sonographers in the field of ultrasound and vascular technology. The student will be responsible for in class review of ultrasound clinical procedures, including anatomy, physiology, disease processes and sonographic appearances, ultrasound physics and instrumentation and vascular physics and instrumentation. In addition, the student will learn post graduate skills to enhance professional opportunities. Prerequisite: Gynecologic Sonography, Small Parts Sonography, Obstetrical Sonography, Abdominal Sonography I, II, and III, Clinical Internship I, II, III and IV and Ultrasound Physics and Instrumentation, Vascular Technology and Vascular Physics and Instrumentation.

UTEC 440. Clinical Internship III. 3 Credits.

Through supervised clinical experience in an ultrasound imaging department and perinatology department the students will gain knowledge and be required to demonstrate competence in gynecologic, obstetrical, small parts, abdominal and vascular clinical imaging and instrumentation including Color and Spectral Doppler evaluation. Prerequisite: Gynecologic Sonography, Small Parts Sonography, Obstetrical Sonography, Abdominal Sonography I and II.

UTEC 445. Clinical Internship IV. 6 Credits.

Through clinical supervised learning situations in a clinical ultrasound imaging department the student will gain knowledge and be required to demonstrate competence in abdominal noninvasive vascular imaging procedures and all aspects of instrumentation. Prerequisite: Gynecologic Sonography, Small Parts Sonography, Obstetrical Sonography, Abdominal Sonography I, II, III and Vascular Technology.

UTEC 450. Clinical Internship V. 6 Credits.

Through clinical supervised learning situations in a clinical ultrasound imaging department the student will gain knowledge and be required to demonstrate competence in abdominal and noninvasive vascular imaging procedures and all aspects of instrumentation. Prerequisite: Gynecologic

Sonography, Small Parts Sonography, Obstetrical Sonography, Abdominal Sonography I, II, III and Vascular Technology.

UTEC 460. Fetal Anomalies. 1 Credits.

This course is designed to provide further understanding of the prevalence, prenatal sonographic features, associated abnormalities, perinatal management, prognosis, and risk of recurrence for both common and rare fetal abnormalities. Prerequisite: Gynecologic Sonography and Obstetrical Sonography.

UTEC 475. Sonography Scanning Techniques III. 1 Credits.

This course introduces concepts of sonographic evaluation including grey scale, color Doppler, and pulse wave of the peripheral venous systems. Students will perform basic scanning procedures and familiarize themselves with anatomy. Sonographic image and case study review will be included. Prerequisite: Advanced Sonography Principles and Instrumentation II and Abdominal Sonography I.

UTEC 480. Sonography Scanning Techniques IV. 2 Credits.

This course introduces concepts of sonographic evaluation including greyscale, color Doppler, and pulse wave of the peripheral arterial systems and indirect testing. Students will perform basic scanning procedures and familiarize themselves with anatomy. Sonographic images and case study reviews will be included. Prerequisite: Gynecologic, Sonography Superficial Structures Sonography, Obstetrical Sonography, and Abdominal Sonography I, II, and III, Clinical Internship I, II, and III, and Sonography Principles and Instrumentation I and II.

UTEC 485. Sonography Scanning Techniques V. 2 Credits.

This course reviews concepts of sonographic evaluation including greyscale, color Doppler, and pulse wave of the areas of the abdomen, superficial structures, OB/GYN, and vascular. Sonographic images and case study reviews will be included. Prerequisite: Gynecologic, Sonography Superficial Structures Sonography, Obstetrical Sonography, and Abdominal Sonography I, II, and III, Clinical Internship I, II, and III, and Sonography Principles and Instrumentation I and II.

UTEC 490. Pediatric Sonography. 1 Credits.

This course is an introduction to pediatric sonography including neonatal head ultrasonography, neonatal spine examination, and pediatric hip evaluation. Prerequisite: Gynecologic, Sonography Superficial Structures Sonography, Obstetrical Sonography, and Abdominal Sonography I, II, and III, Clinical Internship I, II, and III, and Sonography Principles and Instrumentation I and II.