NA640 Chemistry and Physics for Nurse Anesthesia - 3 Credits
This course examines the principles of inorganic chemistry, organic chemistry, biochemistry and physics as they apply to the practice of anesthesia and anesthetic pharmacology. Topics include anesthesia delivery systems, delivery of inhalation anesthetics, fluid and gas mechanics, laser technology, radiology and nuclear medicine, ultrasonography, electricity, and magnetism among others.

Upon completion of this course, the student is expected to be able to:
1. Apply principles of inorganic chemistry, organic chemistry, biochemistry and physics to anesthetic pharmacology.
2. Apply principles of inorganic chemistry and physics to anesthesia delivery systems and monitoring.
3. Apply principles of fluid and gas mechanics to anesthesia delivery and anesthetic pharmacology.
4. Apply concepts of laser technology to safe patient care.
5. Apply theories related to radiology, nuclear medicine, and magnetism to the interpretation of diagnostic data and the provision of safe patient care.
6. Apply principles of ultrasonography to the safe administration of regional anesthetics and intravenous access.

NA635 Professional Writing for Nurse Anesthetists - 3 Credits
This course introduces the student to the expectations of graduate and professional writing and research in the medical field. Topics include: modes of professional communication, APA standards and conventions, essential elements of medically-related reports such as clinical case studies, integrative and systematic reviews, and meta-analysis. Other forms of professional communication will be addressed including correspondence, insurance, incident, and quality assurance reports. Library research tools and use of databases for topic searches will be covered. The ethical and legal ramifications of professional communication are addressed.

Prerequisites: Concurrent enrollment in NA606.

Upon completion of this course, the student is expected to be able to:
1. Apply a process approach to develop an effective writing technique
2. Develop an awareness of audience in written communications
3. Display mastery of grammar and style
4. Display mastery of APA style and formatting
5. Conduct a review of the literature on a specific topic
6. Discuss the ethical and legal ramifications of research
7. Evaluate research writing
8. Demonstrate professional and effective writing and presentation skills

NA606 Research Design and Statistical Analysis - 3 credits
This course provides an overview of research methods and statistical procedures commonly used in health care research, with particular focus on research related to practice as a nurse anesthetist. The course emphasizes analysis of research studies and applied statistical procedures as the foundation for evidence-based practice.
Upon completion of this course, the student is expected to be able to:

1. Discuss the role of research and evidence-based practice in contemporary health care;
2. Utilize qualitative and quantitative research methodologies to evaluate commonly used research designs including randomized clinical trials, crossover designs, quasi experimental designs, and case control studies;
3. Describe the normal curve, standardized scores, and basis for inferential statistics;
4. Interpret the results of common statistical procedures including t-tests, chi-square tests, correlation and regression, analysis of variance, effect sizes, survival analysis, odds ratios, and meta-analysis;
5. Analyze the reliability and validity of measures, interpret graphs and charts, and interpret confidence intervals; and
6. Evaluate research according to internal and external validity, appropriateness of statistics used, methodologies paradigm, and generalizability of results.

NA630 Professional Aspects of Nurse Anesthesia - 3 credits
This course provides the graduate nurse anesthesia student an opportunity to focus on a variety of professional practice components. Topics includes the evolution of the professional inclusive of regulation, policy, and credentialing; ethical and legal implications associated with practice; delivery systems, informatics, and reimbursement. Professional resources and maintaining wellness are also discussed.

Prerequisites: none.

Upon completion of this course, the student is expected to be able to:

1. Analyze changes in the healthcare system influencing patient care.
2. Determine the process and methods used by individual states, state boards of nursing, and healthcare organizations to regulate Certified Registered Nurse Anesthesia practice and credential providers.
3. Identify federal and state law, regulatory agencies, and institutional policies that are applicable to the definition of practice, the assignment of liability, and the definition of malpractice.
5. Discuss strategies to promote wellness and address the CRNA who is impaired.
6. Apply the Code of Ethics for the Certified Registered Nurse Anesthesia and the Code of Ethics for Nurses to the concepts of beneficence, nonmaleficence, practice, and leadership.
7. Discuss theories and concepts related to management and leadership.
8. Describe the roles, responsibilities, and accountabilities of the department manager.
9. Discuss major components, elements, and responsibilities associated with department management.
10. Discuss working with diverse individuals as members of working groups.

NA651 Pharmacology for Nurse Anesthetists - 3 credits
This course introduces basic principles of pharmacology and focuses on those drugs most often used in the practice of anesthesia. The course provides an overview of drug actions, interactions, metabolism, methods of administration, dosages, side effects, precautions, and contraindications.

Prerequisite: NA640.

Upon completion of this course, the student is expected to be able to:

1. Possess a broad in-depth knowledge and understanding of the pharmacology of anesthetic agents.
2. Explain the principles of pharmacokinetics and pharmacodynamics.
3. Describe, for each of the major classes of anesthetic agents and adjuncts presented the pharmacokinetics and pharmacodynamic characteristics, methods of administration, dosages, side effects, precautions, and contraindications.
4. Describe the administration of general and regional anesthetic agents to all ages and categories of patients.
5. Understand the use of a broad variety of anesthetic and adjunctive agents in anesthesia care.
6. Evaluate the patient’s medication history and propose additional diagnostic data as indicated.
NA645 Advanced Physiology and Pathophysiology 1 - 6 Credits
This course builds on the Registered Nurses prior baccalaureate curriculum in anatomy, physiology, and pathophysiology to provide an advanced study in physiology and pathophysiology. This course is the first in a series of two courses. Topics covered in this course include airway anatomy, physiology and pathophysiology, cytology, hematology, immunology, endocrinology, oncology, central and peripheral neurology (including sympathetic and parasympathetic physiology and pathophysiology), osteology, and myology.
Prerequisite: NA640, Concurrent enrollment NA614 & 618

Upon completion of this course, the student is expected to be able to do the following:
1. Interpret the implications of pathophysiology within cellular function and excitable tissues for anesthetic care.
2. Apply knowledge of the anatomy, physiology and pathophysiology of the airway to determine appropriate airway management.
3. Examine the normal and abnormal functioning of all components of the:
   a. central and peripheral nervous systems.
   b. sympathetic and parasympathetic nervous systems
   c. immune system.
   d. endocrine organs and system.
   e. musculoskeletal system
4. Interpret the implications of pathophysiology within the blood cells including anemias, polycythemias, hemostasis and coagulation.
5. Formulate an anesthetic plan for patients with oncological diseases.
6. Differentiate the abnormal from normal functioning of the skeletal and cardiac smooth muscles.

NA 614 Advanced Health Assessment for Nurse Anesthesia 2 credits.
This course builds upon health assessment skills of the practicing critical care nurse and focuses on health assessment across the human lifespan. Skills for efficiently obtaining a patient’s history with regard to psychosocial and cultural differences are discussed. Performing a focused history and physical assessment, incorporating diagnostic information, assessing on-going patient status using relevant monitoring techniques, and determining appropriate and timely intervention during the anesthetic continuum are emphasized.
Prerequisite: NA630

Upon completion of this course, the student is expected to be able to:
1. Determine physiological differences found throughout the lifespan.
2. Perform a logically sequenced patient interview and physical assessment.
3. Describe the use of monitoring technology and its application to planning care and ongoing patient assessment.

NA618 Principles of Anesthesia I – 4 credits
This course begins an in-depth study of the introductory principles of anesthesia including the basic tenants of care for the anesthetized patient. The safe use of anesthesia delivery systems and related equipment is emphasized and applied to individual patient care. Anesthetic techniques are demonstrated with their application to surgical procedures.
Prerequisites: NA630, NA640, Concurrent enrollment NA614

Upon completion of this course, the student is expected to be able to:
1. Apply the professional standards of practice for the certified registered nurse anesthetist with emphasis on patient safety, documentation, and legal aspects of care.
2. Discuss the technology and equipment required for safe anesthesia delivery using a variety of anesthesia delivery systems, regional anesthesia, and analgesia equipment.

3. Plan care for the challenges and complications associated with various physiological states including age, health status, structural abnormalities, and anesthesia-related complications.

4. Formulate an anesthetic management plan that includes preoperative, perioperative and postoperative assessment findings, anesthetic techniques, procedural implications, and individual patient reactions to anesthesia and surgery.

**NA661 Pharmacology - 3 credits**

This course focuses on the pharmacokinetics and pharmacodynamics of major drug classifications. Their interactions with anesthetic agents are discussed.

**Prerequisites:** NA651.

Upon completion of this course, the student is expected to be able to:

1. Describe the pharmacokinetic and pharmacodynamic characteristics, clinical uses, indications and contraindications, potential drug interactions, and therapeutic doses.
2. Evaluate the patient’s medication history and describe additional diagnostic data needed prior to the administration of anesthesia.
3. Describe the interaction between an anesthetic and a patient’s chronic medication regime.
4. Integrate pharmacologic principles related to differing classifications of drugs into patient care plans.

**NA620 Principles of Anesthesia II – 6 credits**

This course is a continuation of NA614 Advanced Health Assessment for Nurse Anesthesia and NA618: Principles of Anesthesia Practice I. Differing patient populations with acute and chronic conditions or disease states are explored in depth resulting in a comprehensive surgical care plan. This care plan is based on the perioperative patient assessment and application of general and regional anesthesia techniques. The application of general principles to individual patients is emphasized.

**Prerequisites:** NA614, NA618 and NA651

Upon completion of this course, the student is expected to be able to:

1. Formulate an anesthetic management plan that includes preoperative, perioperative and postoperative assessment findings, anesthetic techniques, procedural implications, and individual patient reactions to anesthesia and surgery for the following conditions:
   a. neuromuscular diseases
   b. autoimmune diseases
   c. endocrine disorders
   d. renal diseases
   e. liver diseases
   f. cardiovascular disorders
   g. pulmonary diseases
   h. organ transplantation
2. Integrate the implications of physiologic changes and risk factors to plan anesthetic care for mothers in vaginal and C-section deliveries including general, spinal, and epidural anesthesia.
3. Plan anesthetic care for the pediatric patient considering anatomy, physiology, psychosocial needs in the preoperative preparation of the child and family, selection of anesthetic agents, techniques for delivery, and response to complications.
4. Integrate knowledge of complications in the care of patients with various forms traumatic injury and shock.
5. Create plan of care to manage acute and chronic pain.

**NA 650 Advanced Physiology and Pathophysiology II - 6 credits**

This course is the second in a series of two courses. Topics covered in this course include the cardiovascular system,
pulmonology, gastroenterology, nephrology, and hepatology.

Prerequisite: NA645

Upon completion of this course, the student is expected to be able to:
1. Interpret the implications of renal and pulmonary pathology on the acid-base homeostasis.
2. Discuss the implications and therapies associated with both acute and chronic pulmonary issues.
3. Examine the normal and abnormal functioning of all components of the:
   a. cardiac system
   b. vascular system
   c. pulmonary system
   d. gastrointestinal system.
   e. renal system
   f. hepatic system
4. Interpret the implications of pathophysiology in the cardiac mechanical and conductive systems.
5. Formulate an anesthetic plan for patient’s chronic pulmonary diseases.
6. Differentiate between normal and abnormal vascular profiles.

NA780 Clinical Integration - 3 credits
In this course, the student integrates theory with practice by analyzing the anesthetic management of selected cases, participating in simulated patient care, and participating in focused laboratory experiences. Current research is used to support patient care decisions.
Prerequisite: Concurrent enrollment NA771

Upon completion of this course, students are expected to be able to do the following:
1. Develop, present, and defend an anesthetic evidence based care plan based on the actual patient care.
2. Analyze patient care outcomes in terms of planned or actual care delivered.
3. Demonstrate critical thinking and problem solving skills while evaluating actual patient care.
   a. Identify and articulate the indications, contraindications, selected equipment and medications (including drug dose ranges), patient positioning, and potential complications involved in fiberoptic airway management, obtaining central venous access, and performing ultrasound guided regional anesthesia and peripheral nerve blocks.
   b. Develop and execute an anesthesia care plan for a simulated patient care experience.
   c. Reflects upon, assess and evaluate the simulated delivery of patient care in relation to professional development.
   d. Prepare a proposal for a synthesis paper.
4. Prepare a comprehensive review of the literature pertaining to a topic relevant to contemporary anesthesia practice.

NA795 Portfolio I – 1 credit
In this course students document their preparation to assume the role of a CRNA through the creation of a professional portfolio over a period of time. The purpose of the portfolio is to provide evidence and analysis of personal and professional growth, reflect on achievement in relation to learning needs, and critically address contemporary clinical and professional issues, and demonstrate progress towards the program outcome objectives.
Prerequisite: Concurrent enrollment NA771

Upon completion of this course the student will be able to:
1. Demonstrate progress towards the achievement program outcome objectives.
**NA796 Portfolio I – 1 credit**

In this course students document their preparation to assume the role of a CRNA through the creation of a professional portfolio over a period of time. The purpose of the portfolio is to provide evidence and analysis of personal and professional growth, reflect on achievement in relation to learning needs, and critically address contemporary clinical and professional issues, and demonstrate progress towards the program outcome objectives.

**Prerequisite:** Concurrent enrollment NA771

Upon completion of this course the student will be able to:

1. Demonstrate progress towards the achievement program outcome objectives.

**NA797 Portfolio II – 1 credit**

In this course students document their preparation to assume the role of a CRNA through the creation of a professional portfolio over a period of time. The purpose of the portfolio is to provide evidence and analysis of personal and professional growth, reflect on achievement in relation to learning needs, and critically address contemporary clinical and professional issues, and demonstrate progress towards the program outcome objectives.

**Prerequisite:** Concurrent enrollment NA771

Upon completion of this course the student will be able to:

1. Demonstrate progress towards the achievement program outcome objectives.

**NA798 Portfolio IV – 3 credits**

This course is a continuation of NA797 Portfolio III. In this course the student completes the assembly of required documents. The capstone paper or project is presented and defended to a group of faculty members and the community of interest.

**Prerequisite:** Concurrent enrollment NA774

By the end of this course the student will be able to:

1. Demonstrate achievement of the programs outcome objectives.

**NA782 Program Comprehensive Exams - 1 credit**

The student’s mastery of their anesthesia knowledge base is assessed via a series of comprehensive examinations. Examination topics include basic and advanced principles of anesthesia practice, basic sciences (anatomy, physiology, biochemistry, chemistry and physics), professional aspects of anesthesia practice, pharmacology, advanced monitoring, technology and equipment. There are five examinations in this series.

**Prerequisites:** All formal didactic coursework.

Upon completion of this course, the student is expected to be able to:

1. Demonstrate a mastery of their anesthesia knowledge base by obtaining at least seventy percent achievement level on each comprehensive examination.

**NA770 Clinical Practicum I – 2 Credits (150 clock hours)**

Clinical Practicum I provides the student with opportunities to apply the didactic principles of anesthesia to patient care. Students must master the basic skills and routines associated with anesthesia practice and spend time observing anesthesia and surgery in an urban medical center (Abbott Northwestern Hospital or Regions Hospital).

**Prerequisites:** All formal didactic coursework.

Upon completion of this course, the student is expected to be able to:

1. Defines the requisite components of and provides a safe patient care environment at all times. This includes conducting a comprehensive equipment check, preparing needed equipment and supplies, assuring and monitoring
appropriate positioning for all patients throughout the case, protecting patients from iatrogenic complications, and applying all required infection control measures and other standard safety precautions.

2. Demonstrates dexterity while performing procedures including (but not limited to) obtaining arterial and vascular access, positioning of patients, managing the airway, and using airway equipment

3. Discusses the proper care, cleaning, and maintenance of anesthesia equipment and supplies.

4. Select and prepare appropriate pharmacological agents in preparation for anesthesia care.

5. Describes the preoperative and postoperative processes for patients in accordance to practice standards and institutional policy.

6. Consistently demonstrate professionalism, integrity, and the ability to effectively communicate with patients and members of the health care team.

7. Become certified or recertified in Basic Cardiac Life Support, Advanced Cardiac Life Support, and Pediatric Cardiac Life Support.

**NA771 NA774 Clinical Practicum I – 2 or 3 Credits (varies by semester/based on actual clock hours assigned)**

Clinical Practicum I provides the student with opportunities to apply the didactic principles of anesthesia to patient care. Students must master the basic skills and routines associated with anesthesia practice and spend time observing anesthesia and surgery in an urban medical center.

**Prerequisite:** NA620.

Upon completion of this course, the student is expected to be able to:

1. Provides a safe patient care environment at all times.
2. Demonstrate vigilance while delivering patient care.
3. Perform a comprehensive history and physical assessment, creates a relevant care plan, and discusses it with the anesthesia care team.
4. Demonstrate dexterity while performing procedures.
5. Safely administer anesthesia to patients of all ages and physical conditions for a variety of surgical and medically-related procedures.
6. Monitors patients efficiently and accurately.
7. Recognize and appropriately respond to changes in the patient’s condition in a timely way.
8. Provide nurse anesthesia care based on sound principles and research evidence for all phases of the anesthetic process.
9. Communicate effectively with all members of the patient care team, the patient, and their family members.
10. Act with regard to cultural differences.
11. Function within appropriate standards, policies, and legal requirements.
12. Accept responsibility with accountability and integrity in all matters.
13. Demonstrate professional behavior appropriate at all times.

**NURSE ANESTHESIA CLINICAL PRACTICUM**

**NA771** – Clinical Practicum, Summer Semester: 2 credits (480 clock hours)

**Prerequisite:** NA770.

**NA772** – Clinical Practicum, Fall Semester: 3 credits (600 clock hours)

**Prerequisite:** NA771.

**NA773** – Clinical Practicum, Winter Semester: 3 credits (600 clock hours)

**Prerequisite:** NA772.

**NA774** – Clinical Practicum, Summer Semester: 2 credits (480 clock hours)

**Prerequisite:** NA773.