

**GANNON UNIVERSITY**  
**MOROSKY COLLEGE OF HEALTH PROFESSIONS AND SCIENCES**  
**VILLA MARIA SCHOOL OF NURSING**

**COURSE #:** GNURS561-0A

**COURSE TITLE:** Chemistry and Physics for Anesthesia

**PREREQUISITES:** Graduate Standing

**INSTRUCTOR:** K. Stephen Anderson, CRNA

**CREDITS:** 3

**OFFERED:** Spring Semester

**COURSE DESCRIPTION:**

This course reviews basic chemistry and physics and investigates basic physical principles as they relate to clinical nurse anesthesia practice. This course discusses mechanics, fluids, gases, electricity, electronics and instruments as they relate to anesthesia.

The outcomes in this course are in direct accord with the philosophy of the Department of Nursing and the mission of Gannon University. Graduate level courses build on the premise of a strong liberal arts base. Program outcomes assess performance with an understanding that knowledge and value outcomes are inherent in these performance outcomes.

**COURSE OBJECTIVES:**

By the end of this course the student:

1. Make accurate mathematical computations quickly as required for proper use in clinical anesthesia.
2. Describes how physics relate to the practice of anesthesia.
3. Discusses the behavior of fluids, solubility and vaporization in relationship to clinical anesthesia.
4. Applies the behavior of gases and vapors and the flow of gases under anesthesia.
5. Explains the principles of electricity.
6. Describes the application of chemistry to the pharmacology of anesthesia.
7. Discusses the acid base buffer systems it applies to clinical anesthesia.
8. Apply the gas laws to the practice of anesthesia

**METHODS OF INSTRUCTION:**

Lecture, faculty-student discussion, demonstration, audiovisual, literature, research  
Readings assigned

**METHODS OF EVALUATION:**

50% Quizzes  
50% Final exam (comprehensive)

**TEXTS:**

Davis, P.D. (2003), Basic Physics and Measurements in Anesthesia. 5<sup>th</sup> Ed., Elsevier Science,

Kier, Lemont and Cynthia Dowd, The Chemistry of Drugs for Nurse Anesthesia, AANA Publishing,

**GRADING SYSTEM:**

97 – 100	A+
92 – 96	A
89 – 91	A-
85 – 88	B+
80 – 85	B
79 – 80	B-
75 – 78	C+
70 – 74	C
< 70	F

**TESTING POLICY:**

1. Each student is expected to be present and on time for quizzes and examinations.
2. If for some extenuating reason or situation the student is unable to take the quiz or examination they must notify the instructor A.S.A.P. of the absence (contact the school office ext. 2938 or ext. 2080)
3. If applicable the quiz or examination must be made up and taken the day the student returns, at a time designated by the instructor.
4. If the quiz or exam is not made up within the allotted time, the student will receive a grade of “0” for that quiz or exam.
5. No one will be allowed to leave the quiz or exam once it has begun. The student may leave once their examination has been completed and turned in.

**TOPICAL OUTLINE**

Session 1	1/12	Math Review,	Chapter 5, 25 Davis
Session 2	1/20	Review of Chemistry	Chapter 2 Kier & Dowd
Session 2	1/27	Review of Chemistry	
Session 3	2/3	Review of Physics <b>Quiz 1</b>	Chapter 1, 8, 9, 10, Davis
Session 3	2/10	Review of Physics	
Session 4	2/17	Fluids <b>Quiz 2</b>	Chapter 2 Davis
Session 5	2/24	Solubility	Chapter 6, 7

			Davis
Session 6	3/10	Gas Laws <b>Quiz 3</b>	Chapter 4 Davis
			Chapter 1 Kier & Dowd
Session 6	3/17	Application of Gas Laws	
Session 7	3/24	Vaporization <b>Quiz 4</b>	Chapter 11 Davis
Session 8	3/31	Acid Base Buffer	Chapter 19 Davis
Session 8	4/7	Acid Base Buffer	
Session 9	4/14	Sine wave <b>Quiz 5</b>	Chapter 13 Davis
Session 10	4/21	Electricity	Chapter 14, 16
Session 11	4/21	Electricity	
Session 12	4/28	Review/Presentations	
Session 13	5/5	<b>Final Examination</b>	

**Gannon University**  
**Morosky College of Health Professions and Sciences**  
**Graduate Program in Nurse Anesthesia**  
**Villa Maria School of Nursing**

**Course:**                   **Chemistry & Physics Anesthesia**

**Scholarly Activity**

Each student will select a topic and write a paper of up to 7 pages, on one of the below listed topics. Each student will pick one topic, only one topic per student.

This scholarly activity will make up 25% of the final grade. Included with this paper will be a bibliography. Information should be properly cited (using APA format). Each topic must be applied to clinical practice.

**Topic:**

- Fire and Explosion in the OR
- Gas Supplies
- Breathing circuits
- Scavenging Systems
- Automatic Monitoring in Anesthesia
- Pulse Oximetry
- Electrical safety during Anesthesia
- Application of Sine Wave Technology to Anesthesia
- Vaporizers / Vaporization
- Capnographs, Function and Use
- Mechanics of Ventilation
- Heat Regulation during Anesthesia
- Applications of the Principles of Fluid Flow in Anesthesia
- Application of Biological Electrical Potentials to Anesthesia Practice
- How Solubility Effects the Conduction of an Inhalation Anesthetic
- Carbon Dioxide Absorption in Anesthesia
- How Heat and Humidification affect Inhalation Anesthesia
- Solubility
- Diffusion and Osmosis related to anesthesia

-Application of Technology in Anesthesia Practice