Chemistry and Physics of Anesthesia
NUR 879 – 3 credits
Wednesday, 0800 – 1050hr, A107
Spring 2008

Catalog Description:

NUR 879 – Basic chemistry and physics and their relationship to nurse anesthesia practice. Organic and biochemical principles, pharmacological significance, and integration and application of these principles to nurse anesthesia practice.

Course Objectives:

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

1. Integrate basic chemical and physical principles into their understanding of basic metabolic pathways
2. Describe and demonstrate the principles of medical mathematics
3. Define units of measure associated with force, work and resistance
4. Differentiate between laminar and turbulent flow
5. Synthesize knowledge of chemical and physical relations into anesthesia practice
6. Analyze the relationship of molecular structures to pharmacodynamic principles
7. Apply principles of chemistry and physics to anesthesia gas delivery and scavenging systems

Prerequisites: Acceptance into the Nurse Anesthesia Program

Co-requisites:

Standards Documents: The curriculum is guided by the following documents:

2. The American Nurses Association Code of Ethics (http://www.nursingworld.org)
3. Scope and Standards for Nurse Anesthesia Practice
4. Code of Ethics for the Certified Registered Nurse Anesthetist

Course Faculty: Henry C. Talley V, PhD, MSN, MS, CRNA
Office: 517-355-8305
A-119 Life Sciences Building
Henry.talley@hc.msu.edu

Office Hours: Variable – Appointments arranged usually; however, available as needed by students in the Nurse Anesthesia Program to accommodate student schedules
Instruction:
a. Methodology:
Independent study, classroom activities, lectures, assignments, exams, internet assignments, self-evaluation, computer-aided instruction and student/faculty conferences.

b. Required Texts:


Optional Texts:


c. Required Resources, References, Supplies:

Evaluation:
a. Learning Assessments and Grading:
Student progress will be evaluated by examinations. Exams are multiple choice and will be administered during the normal class period at the beginning of class on the day of examination. Exams are not cumulative. Exams will be weighted as follows to calculate the final course grade:

<table>
<thead>
<tr>
<th>Quiz/Examination</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz 1</td>
<td>10%</td>
</tr>
<tr>
<td>Quiz 2</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm Examination</td>
<td>20%</td>
</tr>
<tr>
<td>Quiz 3</td>
<td>10%</td>
</tr>
<tr>
<td>Quiz 4</td>
<td>10%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>30%</td>
</tr>
<tr>
<td>(Cumulative)</td>
<td></td>
</tr>
<tr>
<td>Assignments</td>
<td>10%</td>
</tr>
</tbody>
</table>
It remains possible that the weights for this semester may be altered slightly due to changes in exam difficulty, etc; you will be informed of any changes.

The following grading scale will be used in this class:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>94 - 100</td>
<td>4.0</td>
</tr>
<tr>
<td>87 – 93</td>
<td>3.5</td>
</tr>
<tr>
<td>80 - 86</td>
<td>3.0</td>
</tr>
<tr>
<td>75 - 79</td>
<td>2.5</td>
</tr>
<tr>
<td>70 - 74</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Professionalism:**

A. **General Statement**

B. **Testing**
   All materials brought into a test, except for number 2 pencils with an eraser and calculator must be left in the front of the classroom. Students may not wear coats or jackets during the examination.

   Students may not leave the room until all students have completed their exams.

   If the instructor suspects any sharing during an exam, all students involved will receive a 0 on that exam, and will face all consequences of academic dishonesty according to the MSU College of Nursing Student Handbook.

   Students must use MSU College of Nursing approved calculator for examinations. Students may not borrow calculators from other students during the examination.

   Any student who is absent from an examination must notify faculty prior to the examination. The student will be given the opportunity to make-up the missed exam with the faculty member during office hours. Only one test can be missed and the student given a chance to take a make-up examination during this course. Any other missed exams will be assigned a grade of zero.

C. **Calculators**
   Calculators are permitted; however, cellular telephone calculators and PDA calculators will not be used. No sharing of calculators will be permitted during exams. If calculators are forgotten, students must calculate the answers manually.
D. Electronic Communication Devices
   All cellular telephones are to be placed in the vibration mode or turned off during class. Beepers should be placed in the vibration mode during class. No cellular phones or beepers will be permitted on the student’s person during examinations.

E. Children in the Classroom
   Because of the intensity of these courses, faculty are unable to provide an environment conducive to learning and testing with children present. Students are expected to make child care arrangements in advance.

F. Appeal of Test Question/Grades
   Appeals of test questions must be made within 5 days after the date of the examination. All appeals will be evaluated individually and must be made on the “Appeal of Test Question” form (attached).

   According to the policies of The Michigan State University College of Nursing, grades may be appealed only for reasons of discrimination. All appeals must be made in writing. See the current Student Handbook for the appropriate form. The appeal must be made to the faculty member and course coordinator within one week. The appeal must be accompanied by a legible copy of all student work in the course at the occurrence/failure.

   After appealing to the faculty and course chair, the student may appeal to the MSU College of Nursing Student Support Services Office. Grade appeals must be made in writing to the Director of Student Support Services and to the Associate Dean of Academic Affairs with 5 working days after appealing to the faculty and course chair.

   The third level of appeal may be made in writing to the Dean of the MSU College of Nursing. The last level of appeal is at the university level. Students are referred to The MSU Student Handbook for this process of grade appeal.

G. Progression in the Major
   NUR 879 is a required course in the nurse anesthesia curriculum. In order to progress, a student must pass this course with a grade of “B” or better

H. Change in Calendar
   The faculty reserves the right to alter the calendar as circumstances may dictate. All changes will be announced in class, posted on the College of Nursing website, or via College of Nursing email, and on ANGEL. Students not present in class are responsible for obtaining this information.

I. Official Means of Written Communication-Electronic Mail
   Keeping up with changes or news from Michigan State University and the College of Nursing is the responsibility of the student. Electronic mail or e-mail is an official means of written communication for all students, faculty, and staff.
Policies:

**Academic Integrity:** Article 2.3.3 of the *Academic Freedom Report* states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." In addition, the Nurse Anesthesia Program adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See *Spartan Life: Student Handbook and Resource Guide* and/or the MSU Web site: www.msu.edu). Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, lab work, quizzes, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the www.allmsu.com Web site to complete any course work in NUR 879. Students who violate MSU rules may receive a penalty grade, including – but not limited to – a failing grade on the assignment or in the course. Contact your instructor if you are unsure about the appropriateness of your course work. (See also http://www.msu.edu/unit/ombud/honestylinks.html)

Accommodations for Students with Disabilities: *Students with disabilities should contact the Resource Center for Persons with Disabilities to establish reasonable accommodations. For an appointment with a disability specialist, call 353-9642 (voice), 355-1293 (TTY), or visit MyProfile.rcpd.msu.edu.*

**Disruptive Behavior:** Article 2.3.5 of the *Academic Freedom Report* (AFR) for students at Michigan State University states: "The student's behavior in the classroom shall be conducive to the teaching and learning process for all concerned." Article 2.3.10 of the AFR states that "The student has a right to scholarly relationships with faculty based on mutual trust and civility." *General Student Regulation 5.02* states: "No student shall . . . interfere with the functions and services of the University such that the function or service is obstructed or disrupted. Students whose conduct adversely affects the learning environment in this classroom may be subject to disciplinary action through the Student Faculty Judiciary process.

**Attendance:** Students whose names do not appear on the official class list for this course may not attend this class. Students who fail to attend the first four class sessions or class by the fifth day of the semester, whichever occurs first, may be dropped from the course.

**Course Calendar:** (date of final examination, scheduled according to the *University final exam schedule*, and tentative dates of required assignments, quizzes, and tests, if applicable)
Appeal of Test Question

All inquiries/appeals concerning a disputed answer on an examination must be made on this form. No appeal will be accepted unless received within five (5) days of the examination. All appeals will be evaluated individually.

Student Name: _______________________________________________________

Exam Number: _________ Date of Exam: _________ Date Submitted: _________

Submitted to: _________________________________________________________

1. Write the test number and question as it was written on the exam.

_____________________________________________________________________

2. What was the correct answer according to the test key? ____________________

3. What answer did you select? __________________________________________

4. What concern do you have regarding the question and answer?

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

5. Cite Three References that support your rationale for the answer you selected over the answer on the answer key. References cannot be cited from the internet.

   a.  ________________________________________________________________

   b.  ________________________________________________________________

   c.  ________________________________________________________________

Additional comments may be attached to this form.

Faculty Response to Appeal: Accept ________ Reject _________

Rationale:

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

Faculty Signature: __________________________________ Date: _______________
<table>
<thead>
<tr>
<th>Module</th>
<th>Content/Topic</th>
<th>Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orientation to Syllabus and Review of Basic Chemistry and Mathematics</td>
<td>Talley</td>
</tr>
<tr>
<td>2</td>
<td>Fluid Flow, volume, and flow measurement</td>
<td>Talley</td>
</tr>
<tr>
<td>3</td>
<td>QUIZ 1 Gas Laws, Solubility, and Diffusion/Osmosis</td>
<td>Talley</td>
</tr>
<tr>
<td>4</td>
<td>Measurement of Oxygen, Carbon Dioxide, and Hydrogen Ion Concentration</td>
<td>Talley</td>
</tr>
<tr>
<td>5</td>
<td>QUIZ 2 Environmental Hazards and waste gas management</td>
<td>Talley</td>
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<td></td>
<td>MIDTERM EXAMINATION</td>
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<tr>
<td>6</td>
<td>Physics of patient monitoring; analysis of anesthetic gases and vapors</td>
<td>Talley</td>
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<tr>
<td>7</td>
<td>QUIZ 3 Temperature, heat, and humidification measurements</td>
<td>Talley</td>
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<tr>
<td>8</td>
<td>Heat capacity, latent heat, and vaporization</td>
<td>Talley</td>
</tr>
<tr>
<td>9</td>
<td>Electricity, electrical potentials, and electrical safety</td>
<td>Talley</td>
</tr>
<tr>
<td>10</td>
<td>Fires, explosions, radiation, and safety</td>
<td>Talley</td>
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<tr>
<td>11</td>
<td>QUIZ 4 Patient monitoring: Assessment of awareness and depth of anesthesia</td>
<td>Talley</td>
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<tr>
<td>12</td>
<td>Anesthetic drug delivery systems</td>
<td>Talley</td>
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<tr>
<td></td>
<td>WRAP UP SUMMARY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FINAL EXAMINATION</td>
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</tbody>
</table>