Advanced Physiology & Pathophysiology
NUR 878: 3 credits
Thursday, 1:00-3:40 pm
A-107 Life Sciences Building
Summer 2014

Catalog Course Description: Homeostatic mechanisms in relation to anesthetic case management.

Additional Course Description: NUR 878 – Principles through which the body maintains homeostatic control of bodily functions necessary for life as it relates to anesthetic case management.

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

1. Analyze the basic physiologic and pathological concepts most relevant to clinical application for the advanced practice anesthesia nurse.
2. Synthesize knowledge of human physiology and pathophysiology to understanding the structure-function relationships of the human system.
3. Integrate physiologic and pathophysiologic principles and relationships to develop basic nurse anesthesia management strategies for maintaining homeostasis.

Additional Course Objectives: At the completion of this course the student will be able to:
1. Identify and explain the pathophysiologic conditions that occur in systems and make application in the administration of anesthesia.
2. Synthesize knowledge of pulmonary, neurological, gastrointestinal, and endocrine physiology and pathophysiology in the management of anesthesia.
3. Critically examine the principles of pulmonary, neurological, gastrointestinal and endocrine physiology and pathophysiology and apply this information to the anesthetic case management of the surgical patient.
4. Evaluate the implications and effects that various disease states have on anesthesia selection and perioperative management of surgical patients.
5. Incorporate knowledge of the interrelatedness of pathophysiology on body systems to provide anesthesia care based on sound principles and evidence.

Prerequisites: NUR 877

Standards Documents: The curriculum is guided by the following documents:
   http://www.aacn.nche.edu/education-resources/MastersEssentials11.pdf


Course Faculty: Gayle Lourens, BSN, MS, DNP CRNA

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Office Phone: 517-432-8163
Cell Phone: 517-862-5666
Office Address: A-121 Life Sciences Building
1355 Bogue Street
East Lansing, Michigan 48824

Official Means of Communication – Electronic Mail:
Electronic mail is an official means of written communication for all students, faculty and Staff at Michigan State University and the College of Nursing. Check your e-mail daily. Keeping up with changes in the course is the responsibility of the student.

Office Hours: Variable – Appointments arranged usually; however, available as needed by students in the Nurse Anesthesia Program to accommodate student schedules.

Change in Calendar
The faculty reserves the right to alter the calendar as circumstances may dictate. All changes will be announced in class or posted in the course communication section on D2L.

Instruction:

a. Methodology: Presentation of course content is accomplished through weekly scheduled class meeting times. As adult learners, it is expected that students will complete assigned readings prior to class. Content will be delivered utilizing the following instructional methods:
   - Classroom lectures
   - Classroom discussion / Student Presentations
   - Readings from textbooks, journals or web pages (as assigned)
   - Exams
   - Self-evaluation (Self Assessment)
   - Student/faculty conferences
   - Voice over power points (or an equivalency), narrative and audiofiles

b. Writing Requirements: Students are required to follow APA format guidelines (6th edition) when completing written assignments.
c. Required Texts:


d. Optional Texts:


Required Resources, References, Supplies:

- D2L Helpline
  1-800-500-1554 (24 hours, 7 days/week)
  517-355-2345 (local; 24 hours, 7 days/week)
- Access to, and ability to use, Microsoft Office Word and Power Point
- **Basic** Scientific Calculator (scientific notation, log function, exponential functions, roots, square roots). Note: Calculators on mobile or phone devices are acceptable as calculators in class but **not** during exams.
Frequently Called Telephone Numbers:

- Colleen Wager  
  Graduate Clinical Program’s Secretary  
  A229 Life Sciences Bldg.  
  Phone: 517-432-0474  
  E-mail: colleen.wager@hc.msu.edu

- Nikki O’Brien  
  Student Advisor, Academic Specialist  
  College of Nursing Student Support Services  
  Bott Building C-134  
  Phone: 517-355-8311  
  E-mail: obrienni@msu.edu

Evaluation:

a. **Learning Assessments and Grading:** In order to **Pass** the course, the student must achieve an overall grade of **80% or higher**. Failure to meet 80% in the course will constitute a failing grade and the student will not be allowed to continue in the nurse anesthesia program. The MSN and Nurse Anesthesia Supplemental Handbooks discuss the procedures in the event of a failure of a course. **There is no opportunity for “extra credit” or “make up work” in this course and late work will not be accepted.** Late assignments will be assigned a grade of “0”.

b. **Grading Scale:**

<table>
<thead>
<tr>
<th>%</th>
<th>GRADE</th>
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</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>
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<tr>
<td>70 – 74</td>
<td>2.0</td>
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<tr>
<td>65 – 69</td>
<td>1.5</td>
</tr>
<tr>
<td>60 – 64</td>
<td>1.0</td>
</tr>
<tr>
<td>Below 60</td>
<td>0.0</td>
</tr>
</tbody>
</table>
c. Evaluation Components:

<table>
<thead>
<tr>
<th>Exam / Assignment</th>
<th>Weighted %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 3</td>
<td>20%</td>
</tr>
<tr>
<td>Cumulative Final</td>
<td>30%</td>
</tr>
<tr>
<td>In-Class Presentation (Grading Rubrics on D2L Website)</td>
<td>10%</td>
</tr>
</tbody>
</table>

1. Exams: Three proctored, timed (60 minutes) exams will be administered through the D2L site during the semester. Each exam represents 20% of the final grade. Exams are based on information obtained from assigned readings, online sources, lecture content and class discussions.

2. Cumulative Final: A proctored, timed (120 minutes) cumulative final will be administered during finals week at the end of the semester. The exam represents 30% of the final grade.

3. Students will be assigned to groups of 2 to research and present an assigned topic. A grading rubric is located on the D2L course site. Students will receive an individual grade based on a self evaluation, team member evaluation and the faculty evaluation. The presentation will represent 10% of the final grade.
d. Appeal of a Test Question:
All inquiries/appeal of a test question must **be made on this form.** No appeal will be accepted unless received within 5 days of the posted grade/test review. 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: _________________
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 Services Office. Grade appeals must be made in writing to the Director of Student 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.

e. Testing and Classroom Conduct:
- Class begins promptly at the scheduled time. To avoid class disruption, a student who is late will be asked to join following a class break.
- Attending class is mandatory. A student who misses class or arrives late will be responsible for the missed content and obtaining said content.
- Any student who will be absent from an exam must notify faculty prior to the examination. The student will be given the opportunity to make up the missed exam with the faculty member or faculty-designated proctor. The faculty member will select and schedule the date and time. Only one exam can be missed and made up during this course. Any other missed exam(s) will be assigned a grade of zero.
- All cell phones or handheld devices are to be silenced or turned off during class unless approved by instructor. Checking e-mail or texting during class is disruptive and the student will be asked to leave.
- All materials brought into an exam (except for a writing utensil, eraser and calculator) must be left in front of the room. Students may not wear coats or jackets during an exam.
- A mobile device cannot serve as a calculator. Students who forget to bring an approved calculator to an exam will calculate the problem manually.
- If the instructor suspects any sharing during an exam, all students involved will receive a zero on that exam and will face all consequences of academic dishonesty according to the MSU College of Nursing Student Handbook and Michigan State University Policy.
- Due to the intensity of the course, the instructor is unable to provide an environment conducive to learning and testing with children present. Students are expected to make child care arrangements in advance.

f. Change in Calendar: The faculty reserves the right to alter the calendar as circumstances may dictate. All changes will be announced in class or posted in the D2L course as a communication item.
**Professionalism:** Preparation as an advanced practice nurse requires more than the acquisition and application of knowledge. In addition to the academic standards listed, the student must demonstrate:

- Appropriate interpersonal relations and communications with peers, faculty and MSU College of Nursing staff
- Respect for faculty and classmates
- Honesty and integrity in all academic and professional matters
- The ability to interact with course faculty when there are questions and/or concerns regarding evaluation. The faculty of record or lead faculty should be contacted first.

In order to facilitate a climate of academic excellence and integrity, the faculty of the College of Nursing adopted the following Honor Code. Students are expected to contribute to the legitimacy of their degree by confidentially reporting breeches to this honor code:

- I vow to hold myself and my peers to the highest measure of honesty and integrity
- I commit myself to respectful and professional conduct in all classroom and clinical interactions
- I will neither give nor receive any unauthorized assistance in completing my assigned academic work
- I will always prepare completely to care for my patients before attending clinical
- I will hold in confidence all personal matters coming to my knowledge in the practice of my calling
- I will do all in my power to maintain and elevate the standard of my chosen profession

**University & College Policies:**

The College of Nursing expects that students will demonstrate professional behavior in all situations. Specific expectations for clinical and other professional venues can be found in the appropriate handbook. You are responsible for reviewing and acting in accordance with the policies and procedures found in the following sources, including the following topics: Professionalism, Academic Integrity, Accommodations for Students with Disabilities, Disruptive Behavior, Attendance, Compliance, and Progression.

- CON MSN Student Handbook: [http://nursing.msu.edu/MSN%20Programs/Handbooks/default.htm](http://nursing.msu.edu/MSN%20Programs/Handbooks/default.htm)
- MSU Spartan Life Online: [http://www.vps.msu.edu/SpLife](http://www.vps.msu.edu/SpLife)
- Information for MSU Students: [http://www.msu.edu/current/index.html](http://www.msu.edu/current/index.html)
- Academic Programs: [http://www.reg.msu.edu/AcademicPrograms](http://www.reg.msu.edu/AcademicPrograms)
- Code of Teaching Responsibility and Student Assessments and Final Grades: [http://www.reg.msu.edu/AcademicPrograms/Print.asp?Section=514](http://www.reg.msu.edu/AcademicPrograms/Print.asp?Section=514)
- Integrity of Scholarship and Grades: [http://www.reg.msu.edu/AcademicPrograms/Print.asp?Section=534](http://www.reg.msu.edu/AcademicPrograms/Print.asp?Section=534)
University 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 College 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 http://splife.studentlife.msu.edu/ 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 370. 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 https://www.msu.edu/unit/ombud学术诚信/index.html#regulations

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 (for example, but not limited to, classes . . .) 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. See the Ombudsman's web site for a discussion of student observance of major religious holidays, student-athlete participation in athletic competition, student participation in university-approved field trips, medical excuses and a dean's drop for students who fail to attend class sessions at the beginning of the semester.

College of Nursing Policies: Professional Development Guidelines are found in CON Student Handbooks at CON website. Students are responsible for the information found in the CON Masters of Science in Nursing Handbook and the Nurse Anesthesia Supplement Handbook.
### Course Content

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Content/Topic</th>
<th>Reading Assignments</th>
<th>Faculty</th>
</tr>
</thead>
</table>
| 5/15    | Introduction to course, The RBC, anemias, polycythemia, sickle cell anemia, thalassemia, porphyria, homeostasis (clotting) | Guyton, Chapter 32 (Red Blood Cells, Anemia, Polycythemia)  
Stoelting’s Coexisting Diseases, Chapter 20 (Hematologic Disorders)  
Nagelhout, Chapter 34 (Hematology and Anesthesia)  
Barash, pg 629-632 (Anemia, G6PD, Hemoglobinopathies, Thalassemia) | Lourens |
| Week 2  | Homeostasis (clotting) continued, Immune system, allergic response, infectious diseases | Guyton, Chapter 33-34 (Resistance to Infection & Immunity); 36 (Hemostasis and Blood Coagulation)  
Stoelting’s Coexisting Diseases, Chapter 22 (Infectious diseases) | Lourens |
| 5/22    |                                                                                                                                  |                                                                                                                                                                                                                      |---------|
| Week 3  | Infectious diseases continued; Pulmonary: Anatomy, dynamics of pulmonary ventilation | Series of respiratory lectures by Dr. West (Yes! Founder of “West Zones”):  
https://www.youtube.com/watch?v=F6bgX3bEts&list=PL0B5CB05E9A88362C  
Guyton Chapter 37 (Pulmonary Ventilation); 38 (Pulmonary Circulation)  
Barash, Chapter 11 | Lourens |
| 5/29    |                                                                                                                                  |                                                                                                                                                                                                                      |---------|
| Week 4  | Exam I; Pulmonary circulation; Principles of cellular gas exchange Gas transport in the blood, Regulation of respiration | Series of respiratory lectures by Dr. West  
https://www.youtube.com/watch?v=F6bgX3bEts&list=PL0B5CB05E9A88362C  
Guyton Chapter 39 (Principles of Gas Exchange); 40 (Transport of Oxygen and Carbon Dioxide in Blood and Tissue); 41 (Regulation of Respirations) | Lourens |
| 6/5     |                                                                                                                                  |                                                                                                                                                                                                                      |---------|
| Week 5  | Gas transport in the blood, Regulation of respiration  
Pulmonary functions testing; ABG manipulation (review) | Interactive ABG self-review:  
http://www.vectors.cx/med/apps/abg.cgi  
Nagelhout, Chapter 26 (page 610-650) | Lourens |
| 6/12    |                                                                                                                                  |                                                                                                                                                                                                                      |---------|
| Week 6  | Pulmonary pathophysiology; | Nagelhout, Chapter 26 (page 610-650)  
Stoelting, Chapter 9 | Lourens |
| 6/19    |                                                                                                                                  |                                                                                                                                                                                                                      |---------|
| Week 7 6/26 | Presentations: URI, Cystic Fibrosis, Aspiration Pneumonitis; Croup (including post extubation); Epiglottis | Guyton, Chapter 45 (Organization of the Nervous System); Chapter 47 (Somatic Sensations) Pain Introduction: [https://www.youtube.com/watch?v=PMZdkac4YLk](https://www.youtube.com/watch?v=PMZdkac4YLk) | Lourens |
| Week 8 7/3 | **Exam II**: Central nervous system, peripheral nervous system, neurotransmitters, sensory pathways, brief introduction to pain | | Lourens |
| Week 9 7/10 | CNS Pathophysiology, **Presentations: Multiple Sclerosis**; Autonomic Nervous System | Guyton, Chapter 60 (Autonomic Nervous System) Stoelting, Chapter 10 (CNS Pathology) | Lourens |
| Week 10 7/17 | Endocrine: Pituitary, thyroid, parathyroid physiology and pathophysiology | Guyton, Chapter 74 (Introduction to Endocrine), Chapter 75 (Pituitary and Hypothalmus), Chapter 76 (Thyroid) Stoelting, Chapter 19 (Thyroid, parathyroid pathophysiology) [https://www.youtube.com/watch?v=Vae5CcaPN_8](https://www.youtube.com/watch?v=Vae5CcaPN_8) | Lourens |
| Week 11 7/24 | **Exam III**: Endocrine: Adrenocorticoids, insulin, and glucagone physiology | Guyton, Chapter 77 (Adrenocortical); Chapter 78 (Insulin and Glucagon) Stoelting, Chapter 19 (Adrenal pathophysiology) [https://www.youtube.com/watch?v=06jbq3bxKE0](https://www.youtube.com/watch?v=06jbq3bxKE0) | Lourens |
| Week 12 7/31 | Diabetes; GI physiology and pathophysiology | Guyton 78 (Diabetes) Stoelting, Chapter 14 | Lourens |
| Week 13 8/7 | Obesity / OSA | [http://www.youtube.com/watch?v=jieCaX6LIU0](http://www.youtube.com/watch?v=jieCaX6LIU0) Stoelting, Chapter 16 | Lourens |
| Week 14 8/14 | **Final Exam August 14** | | Lourens |
Power Point Presentation
NUR 878

The power point presentations on the assigned topic will be done in groups of 2. The presentations will be between 15-20 minutes (including question time) and will include:

1. Physiology / Pathophysiology
2. Etiology (Brief)
3. Symptoms and Co-morbidities
4. Treatments
5. Anesthetic implications

The power point presentation will be sent to me via e-mail no later than 1 week before your assigned presentation date. Find a good article (from a reputable journal) that supports or discusses your presentation topic or an aspect of the topic (preferably anesthetic implications). The article can be a scientific study, review article, case study or met analysis. E-mail the article or link to me via e-mail with the power point presentation.

Evaluation of the power point presentation will be worth 20 points divided as follows:

<table>
<thead>
<tr>
<th>Content (accurate, concise, understandable, includes above criteria)</th>
<th>5 points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Command of topic</strong> (able to answer questions from class and instructor)</td>
<td>5 points</td>
</tr>
<tr>
<td><strong>Power Point Slide Presentation</strong> (slides organized, pictures applicable and interesting, article provided, references sited)</td>
<td>5 points</td>
</tr>
<tr>
<td><strong>Delivery</strong> (eye contact, voice clarity, confident, remains within time constraints)</td>
<td>5 points</td>
</tr>
</tbody>
</table>