RSPT 2305: PULMONARY DIAGNOSTICS
COURSE SYLLABUS

COURSE DESCRIPTION
The theories and techniques involved in pulmonary function testing diagnostics with emphasis on blood
gas theory and analysis, quality control, oximetry, and capnography. (3 sem hrs; 2 lec, 3 lab)

COURSE PREREQUISITE
There are no prerequisites for this course.

TEXTBOOKS

STUDENTS WITH DISABILITIES
Any student in this course, who, because of a disabling condition, may require some special
arrangements in order to meet course requirements, should contact Disability Services at 371-5436 (SSC
119) as soon as possible.

COURSE GOALS AND COMPETENCIES
In order to successfully complete the requirements for this course, the student must demonstrate the
competencies as described by the following as evaluated by the faculty in the program.

A. GOALS
1. Develop a basic understanding of acid-base physiology of the blood.
2. Interpret arterial blood gas (ABG) results and make recommendations for appropriate therapy.
3. Develop correct skills in drawing arterial blood samples.
4. Understand the principles of measuring blood gas samples.
5. Understand the principles of using quality control in blood gas analysis.
6. Develop a basic understanding of the assessment of chest radiographs.
7. Develop a basic understanding and application of pulmonary function studies.
8. Develop a basic understanding of common laboratory test associated with lung abnormalities or
disease.

B. PERFORMANCE/LEARNING OBJECTIVES
(MINIMUM COMPETENCIES)
Given the course textbook, personal notes, handouts, and other learning activities, the student
should:
1. Describe the buffering capabilities of the RBC for CO₂.
2. Use the Henderson-Hasselbach equation and describe how CO₂ and HCO₃⁻ determine the pH of the blood.

3. Discuss how the HCO₃⁻/H₂CO₃ buffer system maintains homeostatic conditions in the blood.

4. Describe the role of the renal system in conserving bicarbonate ions.

5. Describe the role of the renal system in the excretion of hydrogen ions.

6. Define pH.

7. Describe the buffering capabilities of the RBC for CO₂.

8. Use the Henderson-Hasselbach equation and describe how CO₂ and HCO₃⁻ determine the pH of the blood.

9. Discuss how the HCO₃⁻/H₂CO₃ buffer system maintains homeostatic conditions in the blood.

10. Compare the roles of the pulmonary system and the renal system and discuss how they maintain the proper pH within the blood.

11. Describe the conditions that cause and correct metabolic acidosis.

12. Describe the conditions that cause and correct metabolic alkalosis.

13. Describe the conditions that cause and correct respiratory acidosis.

14. Describe the conditions that cause and correct respiratory alkalosis.

15. Describe how a condition could arise where metabolic and respiratory acidosis (alkalosis) could occur at the same time.

16. Given a set of blood gases, interpret the patient's acid/base status.

17. Assess a patient's level of oxygenation from an ABG report.

18. Estimate the degree of shunt in pulmonary circulation using the a/A.

19. Calculate the recommended FIO₂ to attain a desired FIO₂ from an ABG report.

20. Calculate oxygen indices using correct formulas.

21. Given a set of blood gases, give a complete interpretation.

22. Describe the theory and technique for measuring pH. (Sanz electrode)

23. Describe the theory and operation of the PO₂ electrode. (Clark electrode)

24. Describe the theory and operation of the PCO₂ electrode. (Severinghaus electrode)

25. Describe the theory of spectrophotometry in measuring reduced hemoglobin, oxyhemoglobin, and carboxyhemoglobin.

26. Describe the principles for measuring pH, PCO₂, and PO₂ using a modern blood gas analyzer.

27. Describe the theory and procedure of "slope" and "cal" when calibrating a blood gas analyzer.

28. Describe routine precautions an operator should follow when analyzing a blood gas sample.

29. Describe the symbols and abbreviations commonly used with pulmonary function (PF) studies.

30. Calculate gas volumes at different temperatures, pressures, and saturations.

31. Describe the tests performed in ventilation studies.

32. Perform ventilation tests.

33. Describe the correct procedure for performing a screening spirometry.

34. Perform a screening spirometry.

35. Describe the correct technique for performing routine spirometries.

36. Describe the tests performed on a routine spirometry.

37. Perform a routine spirometry and calculate the results.

38. Describe the characteristics of obstructive lung disease.

39. Describe the characteristics of restrictive lung disease.

40. Describe the equipment used in the PF laboratory.

41. Describe the procedures for measuring RV, FRC, and TLC.

42. Perform a lung volume study and calculate the results.

43. Describe the different types of flow-volume loops characteristic of obstructive and restrictive diseases.

44. Perform a flow-volume loop measurement and calculate the results.

45. Describe the characteristics of lung diseases that affect diffusion of gases across alveolar capillary membranes.

46. Describe the procedure and calculations for a diffusion study using CO.

47. Perform a DLco study and calculate the results.

48. Describe the procedure for measuring lung compliance.

49. Describe the method for assessing TLC by planimetry.

50. Describe the method for measuring TGV and Raw on the body plethysmograph.
51. Perform a TGV and Raw measurement on the body plethysmograph.
52. Describe the tests measured during exercise testing.
53. Describe the operating principles of a pulse oximeter and capnograph.
54. Identify limitations of noninvasive monitoring devices and differentiate false negatives and false-positives readings from reliable clinical data.
55. Interpret data obtained from noninvasive monitors and correlate the results to the patient’s condition.
56. Given a chest x-ray, verify the patient identify, film projection, position, and quality of the film.
57. Identify the major organs and anatomic landmarks on an adult and infant chest x-ray.
58. Correctly describe the position of an endotracheal tube on a chest x-ray.
59. Assess a chest x-ray and differentiate normal and abnormal changes from disease states.
60. Differentiate chest deformities from normal chest structure.
61. Describe laboratory assessments used for pulmonary diseases.
62. Describe normal ranges and significance and changes for standard laboratory tests.

A minimum grade of "C" must be earned by each student to successfully complete the goals of this course.

REQUIRED EXAMINATIONS

This course will have four major examinations during the semester and a comprehensive final at the end. If a student is absent for a regularly scheduled examination, the student may take a makeup examination but the highest grade a student can earn is 75%. All material given in this course will be tested during the four major examinations.

GRADING

1. Each examination will be weighted and will have a specific value of points awarded for correct answers.
2. Additional assignments/problems will be given with a specified value or points.
3. A laboratory practical will be given for this course.
4. A laboratory notebook prepared by the student will be required for this course.
5. At the end of the course, all possible points from examinations and other assignments will be totaled. This total will be the maximum possible points a student could earn.
6. The number of points earned by a student will be divided by the maximum possible points for the course. The quotient will be expressed as a percent and converted to a final grade.

The grading scale for this course is:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
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<tbody>
<tr>
<td>A</td>
<td>92-100</td>
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<tr>
<td>B</td>
<td>83-92</td>
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<td>75-82</td>
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<td>D</td>
<td>65-74</td>
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<td>F</td>
<td>score less than 65</td>
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Components of the Final Grade

1. Major examinations - 100 pts. ea.* .......................................... 400 - 500*
2. FINAL examination - 100 pts.* ........................................... 150 - 200*
4. Notebook ........................................................................... 100
3. Problems ........................................................................... 100*

750 - 900

* The weight of each evaluation tool may vary due to the construction of each exam and the content covered.
STUDENT RESPONSIBILITIES AND CLASSROOM ETIQUETTE

1. The student should read assignments prior to class and be prepared to discuss topics covered in class. Students will be called on to share their understanding of topics.

2. Assigned homework is to be completed before class. Homework cannot be completed in class unless time is given by the instructor.

3. All students are responsible for their own work.

4. Students should not engage in conversations during class unless it is directly related to the course or material being covered.

5. Students are responsible for equipment loss or damage if such loss is due to abuse or intentional neglect by the student.

6. Turn cell phones and pagers off during class. Vibrating phones or pagers are acceptable unless they disturb the class. No telephone conversations are permitted in the classroom without instructor permission. No cell phone may be in the classroom during an examination.

ATTENDANCE POLICY

A student who plans to pass this course should also plan to regularly attended all lecture sessions. Students chronically late for class or those with excessive absences may be at risk in passing this course. Each student with a tardy/attendance problem will be addressed on an individual basis with the instructor.

GRIEVANCE PROCEDURE

A student who develops a problem with a course policy or the course instructor, should first, try to resolve the problem with the instructor or program director. If the problem cannot be resolved at this level, the student should go to the Division Chairman of Allied Health, the Dean of Instruction, and the college President, in that order.

Bill Young – Office: WCAH 116 - Phone: 806-354-6058 Cell phone: 236-7435
Office hours are posted outside of office.
### RSPT 2305: COURSE SCHEDULE - Summer 2008

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>SECT.</th>
<th>LECTURE</th>
<th>LABORATORY</th>
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<tbody>
<tr>
<td>1.</td>
<td>5/19</td>
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<td>Course Descript. Meta. Pathways</td>
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<td>2.</td>
<td>5/20</td>
<td>1,2</td>
<td>Acid-Base, Renal Regulation</td>
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<td>3.</td>
<td>5/21</td>
<td>2,3</td>
<td>Renal Reg., Meta. Disturbances</td>
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<td>4.</td>
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<td>3,4</td>
<td>Metabolic, Resp. Disturbances</td>
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<td>5/23</td>
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<td>No Class</td>
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<td></td>
<td>5-26</td>
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<td>Memorial Day</td>
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<td>5.</td>
<td>5/27</td>
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<td>EXAM 1, ABG Analysis</td>
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<td>EXAM 2, Review E-1, ABG, Sampling</td>
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<td>Review E-2, ABG Sampling, QI</td>
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<td>ABG Stickarm, Arterial line</td>
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<td>Exam 3, Radiological Assessment</td>
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<td>Radiological Assessment</td>
<td>CXR-Self Assessment, Case studies</td>
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<td>14.</td>
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<td>8,9</td>
<td>EXAM 4, PF Equipment</td>
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<td>15.</td>
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<td>Review E-4, PF Equipment</td>
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<td>16.</td>
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<td>Screening PF, Spirometry</td>
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<tr>
<td>18.</td>
<td>6/18</td>
<td>11,12</td>
<td>Patterns of Obst., Rest., Diff.</td>
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<td>6/19</td>
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<td>Metabolic Studies</td>
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<td>20.</td>
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<td>PF Interpretation, Med. Lab. Assessment</td>
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<td>COMPREHENSIVE FINAL</td>
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RSPT 2305: Pulmonary Diagnostics

I have received a copy of the syllabus.

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Student Signature                          Date