

Bergen Community College
Division of Health Professions
Department of Respiratory Care

RSP-241 NEONATAL/PEDIATRIC RESPIRATORY CARE
COURSE SYLLABUS

Semester and Year:

Course and Section Number: RSP-241 Lab sections 001-004

Meeting Times and Locations: Lecture Tuesday 8:20-10:15AM, Room HP-302.
Labs: Monday 08:20-10:15, Monday 10:30-12:30PM, Tuesday 10:30-12:30,
Wednesday 12:00-2:00PM. All labs are held in room HP-230.

Instructor:

Office Location:

Phone:

Departmental Secretary:

Office Hours: Tuesday

Email Address:

Course Description

List lecture hours, laboratory hours, and credits: 2.0 lectures, 2.0 labs, 3.0 credits

List prerequisites and co-requisites: Prerequisites: RSP 110,119,121, 210,220,
222,225,226,231,240,250 Co-requisites: RSP 235, 260.

Course Description: This course provides a comprehensive overview of pediatric and neonatal respiratory care. Special considerations of respiratory care practice unique to pediatrics and neonatology are discussed. Topics include pediatric anatomy and physiology, fetal development, clinical assessment, oxygen therapy, airway management, mechanical ventilation, resuscitation, cardiopulmonary pathophysiology and disorders specific to this specialty profession within respiratory care.

Course Content

This course is intended to introduce students to the basic fundamental concepts of neonatal-pediatric respiratory therapy. The course begins with the foundations of respiratory care such as patient assessment skills of the neonate and pediatric patient. The course then covers basic therapeutics including infant and child CPR, airway management, medical gas therapy and delivery, aerosol and humidity therapy, aerosol drug therapy, lung expansion therapy and bronchial hygiene therapy. The course culminates to provide an in depth understanding of all aspects of fetal development, circulation, neonatal and pediatric airway diseases, mechanical ventilation, nasal CPAP management and homecare of the neonatal/pediatric patient.

The Instructional Methods: Lecture, laboratory, PowerPoint, Internet, small group discussions, review questions, clinical simulations.

Special Features of the Course (if any)

Moodle Room is used to enhance the interaction with the student.

Course Texts and/or Other Study Materials

Egan's Fundamentals of Respiratory Care, Kacmarek, Stoller, Heuer 11th Ed. Mosby 2017. ISBN 978-0-323-34136-3

Neonatal and Pediatric Respiratory Care, Walsh, 5th Edition ISBN 978-0-323-47947-9

Competency System by DataArc. Already purchased. \$82.00

How to Get the Book(s) for the Course: You can get the book(s) at the Bergen Community College Bookstore, either in person or on line.

Research/Oral Presentation Project

Criteria for Organization of Oral Presentation Project

1. Presentation must be at least 10-15 minutes in length.
2. Handouts, pictures, PowerPoint or other sources may be used.
3. Presentation must be clear, concise and a thorough review of material.

Format for presentation:

Background information: i.e., current statistics

Etiology

Pathophysiology

Clinical signs and symptoms

Diagnostic tests/labs/CXR/etc.

Treatments/medications.

See grading rubric posted on moodle.

Grading Policy

| | |
|---|------|
| Lecture Examinations/Multiple Choice (2 @ 20% each) | 40% |
| Laboratory practical exam: Synthesis/Evaluation | 20% |
| Oral Presentation project | 20% |
| Clinical Simulations (2) | 20% |
| Total | 100% |

Recommended Practices

To succeed in this course, you should do the following:

- Read and follow the Course Syllabus.
- Follow the Course Calendar and also the Course Outline, Reading Assignments.
- Do all required reading and writing assignments in accordance with the "Course Outline, Reading Assignments, and Course Calendar".
- In addition to the required text readings, study the PowerPoint presentations.
- Participate actively and frequently in all class discussions and other class activities.
- Review (everything).
- Keep in touch with me – in class, by phone, by email, and during my office hours. Don't become "invisible" or otherwise fade away.

Important College Policies – See the BCC Online Catalog

Withdrawal from Classes and Refunds

Grading

Course Grade Appeal Policy

Academic Integrity and Plagiarism. **[Read this carefully.]**

Class Attendance Policy

Acceptable Use of Information Technology Resources

Code of Student Conduct

Alcohol and Drug Policy

Family Education Rights and Privacy Act of 1974.

Sexual Harassment Policy

Campus Assault Victim's Bill of Rights.

Smoking Policy

Traffic Regulations

Attendance Policy

Respiratory Therapy Departmental Attendance Policy:

Attendance Policy: Effective fall 2019

Attendance and punctuality at all class sessions is required and will be factored into the student's overall final grade. Attendance for classroom lecture and lab will be factored into the total grade for the course. For every absence from classroom lecture or lab, 1 point will be deducted from the total grade for the course. If the student is late by 10 minutes for the lecture or lab, 0.5 points will be deducted from the total grade.

If students occasionally arrive late, they should be encouraged to enter quietly, not disturbing the class. If students miss class, they should be encouraged to use the

course calendar to stay abreast of material. It is probably a good idea for students to find study partners and to exchange telephone numbers.

Late work or Assignments:

Make-ups for examinations and course work will be the exception and only sparingly approved by the instructor. If, in the instructor's judgment, the student has presented a good excuse for missing the examination or work, the instructor may approve a make-up examination with the exam penalized. If the student does any late work, they will be penalized, and their grade will be no greater than 75%. Makeup exams and quizzes will be completed at the end of the semester.

Course Website

This section of RSP-241 Neonatal/Pediatric Respiratory Care is a "web-enhanced" class. The class has its own website, and each member of the class has an account for the website. The BCC online course management system is known as "Moodle Rooms." To access your website account (your "My Moodle Rooms" page), go to <http://dl.bergen.edu>, and log in with your **User Name** and your **Password**. Your User Name is the same one you use for WebAdvisor; and your Password is up to the first 8 letters of your last name and the last four digits of your social security number (lower case letters; no spaces, hyphens, or apostrophes). The course website contains an online version of our course syllabus, a regularly-updated list of course announcements, PowerPoint presentations on the readings for the course and a course calendar. I expect you to utilize the website and its facilities throughout the semester.

If necessary, we will also discuss in class how to access and use the course website.

Departmental Policy Statements

1. Acceptable quality of work and mature behavior are expected from every student at all times. Students are regarded as professionals and are expected to conduct themselves accordingly.
2. High standards of professional performance demand that students maintain good academic progress throughout their course of study in the program.
3. Students demonstrating chronic tardiness or absenteeism will be placed on academic warning or probation, and may be subjected to termination from the program.
4. Absence from a class during a scheduled exam will be subject to the policy of the instructor for that specific course. If the student is going to miss a scheduled exam it is expected that the student will contact the instructor ahead of time by e-mail or phone to the department office.
5. All students are required to adhere to the policies and procedures of the school as outlined in the college catalogue.
6. Additional department policies are located in the Student Policies and Procedures Manual.
7. No cell phones allowed during class, exams and when exams are reviewed. This policy will be strictly enforced.

Student and Faculty Support Services

1. The program faculties maintain office hours for counseling and are available to provide tutorial assistance to students.
2. Students must make appointments in advance to meet with the respective instructors.
3. Students may also obtain assistance from the College Tutoring Center. Appointments must be made in advance through this center.
4. The College has a personal counseling center for those students who may need personal assistance. Appointments are made directly through this center.
5. Any problems, concerns, or questions should be directed to the course instructor or the student's advisor.

The Sidney Silverman Library is committed to providing a quiet, welcoming, respectful atmosphere conducive to study and research in an environment that is comfortable, clean, and safe. The use of the library will be beneficial in providing resources on researching topic information, citation styles, finding current articles among many other media services available.

Grading System

| | |
|----|------------------------------|
| A | 93 -100% |
| B+ | 88 – 92.9 % |
| B | 83 – 87.9 % |
| C+ | 78 – 82.9 % |
| C | Not acknowledged |
| D | Not acknowledged |
| F | Below 78% |
| W | Official course withdrawal |
| E | Unofficial course withdrawal |

Course Outline, Goals and Objectives

Section 1: Fetal Development, Assessment and Delivery

Walsh: Chapters 1-3 and Chapter 14 Surfactant Replacement Therapy

Goal: To acquaint the student with embryologic development, fetal circulation, fetal structures, fetal growth and development, fetal assessment tests, high risk pregnancies, labor, delivery, and fetal to adult circulation.

Objectives: For each objective listed, the student will learn with a minimum 75% accuracy. As a result of the successful completion of this course, the student will be able to:

1. Describe the embryology of the morula, blastocyst, blastoderm and trophoblast.
2. Identify the five periods of embryonic lung growth and describe the features of each period.
3. Define surface tension and how it is developed.
4. Describe the purpose and function of surfactant.
5. Describe the indications, contraindications, administration techniques and outcomes of surfactant therapy.
6. Explain how lung maturity is determined.
7. Describe the embryologic development of the heart, cardiac chambers, vessels and the cardiac valves.
8. Explain fetal circulation and the pressure differences between the right and left heart.
9. Trace the flow of blood through fetal circulation.
10. Outline the development of the fetus with emphasis on cardiopulmonary development, including the relationship of gestational age to key structures.
11. Describe the changes that occur during the fetal-neonatal transition.
12. Explain the significance of lecithin/sphingomyelin ratio testing, and identify normal and abnormal results.
13. Explain how fetal scalp pH is used to assess fetal asphyxia.
14. List and describe the methods used to estimate the date of delivery.
15. Explain the implications of meconium-stained amniotic fluid in assessing fetal status.
16. Explain what is meant by the term “high risk infant”.
17. List the factors which determine a “high risk infant”.
18. Identify the most common birth presentation.
19. List the five events that make up the birth process.
19. Describe each of the following: complete breach, incomplete or footling breach, frank breach, face presentation, transverse lie, prolapse of umbilical cord.
20. Identify and describe placenta previa.
21. List the factors that are responsible for the first breath.

Section II and Section III: Assessment and Monitoring of the Neonatal and Pediatric Patient and Section III Therapeutic Procedures for Treatment of Neonatal and Pediatric Disorders

Walsh: Chapters 4-9 and Chapter 10-13 and Chapter 20 Pharmacology

Goal: To familiarize the student with the techniques of resuscitation and stabilization of the infant, physical assessment of the neonatal and pediatric patient, basic interpretation skills of chest x-rays, respiratory care procedures of the newborn, and thermoregulation of the newborn.

Objectives: For each objective listed, the student will learn with a minimum 75% accuracy. As a result of the successful completion of this course, the student will be able to:

1. List the four factors that can lead to fetal asphyxia.
2. Discuss the effects of asphyxia on the lungs.
3. List and describe the three factors that provide proper preparation for a resuscitation.
4. Describe the ABC's of an infant resuscitation.
5. Discuss thermoregulation in infants and the special problems it represents.
6. Discuss the use of fetal blood sampling.
7. Contrast normal neonatal blood gas results to that of an adult.
8. Explain in detail the use of Apgar scoring, normal and abnormal values.
9. Discuss the indications, procedure for placement, and complications of an umbilical artery catheter.
10. Identify the methods of obtaining blood samples for analysis and describe why the UAC is the preferred blood sampling site.
11. Identify those arterial sampling sites that are pre-ductal and post-ductal and describe how a right-to-left shunt through the ductus arteriosus can be detected using blood gas PaO₂, transcutaneous monitors, or pulse oximeters.
12. Identify the hazards associated with each of the blood gas sampling methods.
13. Describe the importance of the consistency in performance of the heel stick sampling.
14. Identify the purpose of the Ballard Score in evaluation of the newborn.
15. State three anatomic and physiologic differences between the infant and the adult.
16. Identify normal chest structures on chest x-rays.
17. Describe the difference between croup and epiglottitis on x-ray.
18. Identify pneumothorax and IRDS on x-ray.
19. List the indications and contraindications of airway clearance therapy.
20. Discuss the physiology of thermoregulation including a description of the thermo neutral zone.
21. Describe how a neonate reacts to cold stress and to hyperthermia.
22. Discuss thermoregulation of the neonate in the delivery room and nursery to include methods of heat loss prevention.
23. List and discuss the physiologic factors and mechanisms of drug transfer across the placenta.
24. Define a teratogenic substance and describe its actions on the fetus.
25. Discuss absorption, distribution, metabolism, and excretion as it relates to neonatal and pediatric pharmacology.

26. For each of the following cardiovascular conditions, describe at least one drug that is used in its treatment: CHF, closure of the ductus arteriosus, pulmonary hypertension, hypotension, and edema.
27. List at least one drug from each of the categories of respiratory medications. For each drug listed, describe briefly its indications and dosage: sympathomimetic, parasympatholytic, and steroid, antiviral.
28. Describe at least one drug from each of the following categories. Include the indications and adverse effects: anticonvulsant, steroid, sedative, paralytic.
29. Explain the effects of maternal drug abuse on the fetus.

Section IV: Neonatal and Pediatric Disorders: Presentation, Diagnosis and Treatment

Walsh Chapters 22-33

Goal: To introduce the student to perinatal lung disease and other problems of infant prematurity, causes of persistent perinatal illness, and pediatric diseases requiring respiratory care procedures.

Objectives: For each objective listed, the student will learn with a minimum 75% accuracy. As a result of the successful completion of this course, the student will be able to:

1. Describe the clinical signs of cardiopulmonary distress in the newborn and pediatric patient. Contrast these responses to the adult.
2. Discuss the evaluation of the newborn and pediatric patient including, identification of risk, clinical assessment, and monitoring techniques.
3. Discuss the etiology, epidemiology, pathology, pathophysiology, clinical manifestations, complications, course and treatment of specific neonatal and pediatric disorders as follows:

Infant Respiratory Distress Syndrome, Bronchopulmonary Dysplasia, Retinopathy of Prematurity, Intracranial and Intraventricular hemorrhages, Sudden Infant Death Syndrome (SIDS), Transient Tachypnea of the Newborn (TTN), AOP, Meconium Aspiration, Pneumothorax, Pneumopericardium, Central and Obstructive Apnea, Persistent Pulmonary Hypertension, Patent Ductus Arteriosus (PDA), Persistent Fetal Circulation (PFC), Asthma, Respiratory Syncytial Virus (RSV), Bronchiolitis, Cystic Fibrosis, Croup, Epiglottitis, Aspiration/poisoning Syndromes, Tetralogy of Fallot, Ventricular Septal Defects, Atrial Septal Defects, Shock and Meningitis, Pediatric trauma, Surgical Disorders and congenital disorders of the airway, diaphragm, and the chest wall.

4. Explain how infections are acquired by the fetus and the neonate.
5. Identify the effects of cytomegalovirus, rubella, herpes simplex, and toxoplasmosis on the developing fetus.
6. Describe the diagnosis, prevention and treatment of infection in the neonate.

Management of Oxygenation and Ventilation Walsh Chapters (15-19)

Goal: To familiarize the student with the concepts of mechanical ventilation as it relates to the neonatal pediatric patient, to understand the conventional methods of mechanical ventilation, and to become familiar with the special procedures and non-conventional ventilatory techniques used today.

Objectives: For each objective listed, the student will learn with a minimum 75% accuracy. As a result of the successful completion of this course, the student will be able to:

1. Describe the indications of mechanical ventilation in the neonate and the methods to achieve this goal.
2. Define how ventilator parameters are determined and the appropriate settings and alarms for each one.
 - a. PIP peak inspiratory pressure
 - b. Tidal volume
 - c. Respiratory rate
 - d. Inspiratory time
 - e. Mean airway pressure
 - f. Minute ventilation
 - g. Flow rates
 - h. I:E ratio
 - i. PEEP/CPAP
 - j. CMV/SIMV/PS
3. Compare and contrast dynamic and static compliance.
4. Describe the determinants of pulmonary compliance and resistance.
5. Determine initial ventilator settings for various patient sizes.
6. Identify common complications of CPAP and how they can be avoided.
7. Describe the indications and contraindications of continuous positive airway pressure (CPAP) and describe how it increases FRC.
8. Demonstrate how to set up a Nasal CPAP system/H2O system and mechanical ventilator system, describe the monitoring, hazards and weaning of this therapy.
9. Describe the important elements of a neonatal ventilator circuit.
10. Compare and contrast volume ventilation and pressure ventilation with regard to the advantages and disadvantages.
11. Compare and contrast the methods of weaning a neonatal patient and a pediatric patient from mechanical ventilation and the techniques of extubation.
12. Identify the advantages and disadvantages of High Frequency Jet Ventilation and High Frequency Oscillatory Ventilation.
13. Discuss how gas is delivered and exhaled during HFJV.
14. Describe ECMO therapy, how it is initiated, the indications for the termination and the complications associated with its use.
15. Describe the effects of NPPV on respiratory function.

16. Identify neonatal/pediatric disorders amenable to a trial of NPPV versus those that do not warrant the therapy.
17. Discuss how adjustments in inspiratory and expiratory positive airway pressures affect respiratory function.
18. Discuss common complications and contraindications to NPPV.

Section V Transport, Homecare, and Quality and Patient Safety

Walsh Chapters 34-36

Goal: To familiarize the student with the different types of perinatal transport, equipment and skills required, infant preparation, patient selection and preparation for home care, the role of the case manager, family training, oxygen therapy and home apnea monitoring, and quality and patient safety.

Objectives: For each objective listed, the student will learn with a minimum 75% accuracy. As a result of the successful completion of this course, the student will be able to:

1. Discuss and recognize the importance of team composition, roles and education.
2. Compare and contrast the types of transport, with regard to distances covered, advantages and disadvantages.
3. Discuss the effects on altitude on PaO₂ and discuss the changes required in FiO₂ as altitude increases to maintain PaO₂.
4. Describe the skills required by transport personnel.
5. List the equipment needed for transport and describe the modifications required for use during transport.
6. Discuss the preparation required before transporting the infant.
7. Review safety and accreditation requirements for pediatric transport agencies.
8. Identify the factors that make home care preferable over hospital care.
9. Describe steps in selecting a home care patient and all the discharge steps to home.
10. Describe preparation, selection, and training of parents and family for a home ventilator patient.
11. Describe the equipment and techniques for administering aerosols, chest physiotherapy and suctioning in the home.
12. Regarding home apnea monitoring, describe each of the following: identification of patients for monitoring, problems associated with home monitoring.
13. Compare and contrast oxygen concentrators, liquid systems, and cylinders for home oxygen use.
14. Discuss the role of each care giver who is involved with discharge planning and the critical components of a discharge plan including the role of the case manager.
15. Discuss the effects of home care on the family.
16. Describe why home care fails and what the practitioner can do to prevent failure.