



Course Number and Title: RCT 210 Neonatal/Pediatric Respiratory Care

Campus Location:

Georgetown, Wilmington

Effective Date:

2020-51

Prerequisite:

RCT 231

Co-Requisites:

RCT 232, RCT 252

Course Credits and Hours:

3.00 credits

3.00 lecture hours/week

0.00 lab hours/week

Course Description:

This course covers neonatal and pediatric diseases and the analysis of effective delivery of respiratory care modalities to these patients.

Required Text(s):

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

Additional Materials:

Instructor handouts All program and policy manuals/handbook

Schedule Type:

Classroom Course

Disclaimer:

None

Core Course Performance Objectives (CCPOs):

1. Identify and discriminate fetal heart and lung structures, including the embryological development of the fetal lung. (CCC 1, 5; PGC 1,2)
2. Describe the anatomical and physiological changes that occur within the heart and lung following birth. (CCC 1, 5; PGC 1)
3. Summarize and categorize methods of assessing prenatal and perinatal history.
4. (CCC 1, 2; PGC 1)
5. Interpret signs of cardiopulmonary distress in a newborn and relate these to arterial blood gas measurements. (CCC 1, 2; PGC 1, 2)
6. Analyze and discuss the etiology, pathophysiology, clinical manifestations, and laboratory data in order to select the appropriate respiratory therapy and pharmacological treatment modalities. (CCC 1, 2, 5, 6; PGC 1, 2)
7. Describe and classify several congenital cardiopulmonary anomalies in the newborn. (CCC 1; PGC 1)
8. Explain the use of artificial airways in neonatal and pediatric patients. (CCC 1, 2; PGC 1)
9. Describe and classify the use of various oxygen delivery devices in the newborn and pediatric patients. (CCC 1, 2; PGC 1)
10. Describe and classify the use of various continuous positive airway pressure (CPAP) devices, pressure-limited ventilators, and volume ventilators. (CCC 1, 2; PGC 1)
11. Describe and compare the indications, dosage, and application of therapeutic administration for the use of surfactant replacement therapy. (CCC 1, 2; PGC 1)
12. Interpret the clinical indications for cardiopulmonary resuscitation, and describe the procedure. (CCC 1, 2; PGC 1, 2)
13. Interpret the clinical indications and describe the application for mechanical ventilation for neonatal and pediatric patients. (CCC 1, 2; PGC 1, 2)
14. Interpret the clinical indications for the use of selected advanced techniques for neonatal life support. (CCC 1; PGC 1)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

Measurable Performance Objectives (MPOs):

Upon completion of this course, the student will:

1. Identify and discriminate fetal heart and lung structures, including the embryological development of the fetal lung.
 1. Differentiate among the following types of births:
 1. Term
 2. Preterm (premature)

3. Post-term (postmature)
2. Explain the three (3) primary germ layers that develop into the embryo.
3. Discuss which of the three primary germ layers give rise to:
 1. Lungs
 2. Diaphragm
4. Differentiate between an embryo and a fetus with regard to their chronological development during gestation.
5. Classify and approximate the stages of lung development with corresponding time frames:
 1. Fetal
 2. Postnatal
6. Explain the sequential embryologic development of the lung.
7. Summarize three (3) physiologic alterations in homeostasis that inhibit the production of surfactant.
8. Discuss the function, characteristics, and development of pulmonary surfactant in the fetal lung.
9. Summarize how the following test methods on amniotic fluid can indicate the developmental state of lung maturity in the fetus:
 1. Lecithin-sphingomyelin (L/S) ratio
 2. Shake test
 3. Saturated phosphatidylcholine (SPC)
2. Describe the anatomical and physiological changes that occur within the heart and lung following birth.
 1. Illustrate the flow of fetal blood throughout the structures in the placenta.
 2. Explain the four main functions of the placenta during intrauterine life.
 3. Illustrate the flow of maternal blood throughout the structures associated with the uterine wall-placenta interface.
 4. Outline the path of diffusion for gas exchange to occur between maternal and fetal blood.
 5. Diagram the flow of blood throughout the structures of the fetal circulation.
 6. Delineate the differences between the fetal and the normal adult circulation.
 7. Identify and explain the anatomic position and the physiologic significance of the following:
 1. Crista dividens
 2. Foramen ovale
 3. Ductus arteriosus
 4. Ductus venosus
 8. Explain the normal values for:
 1. Umbilical vein SaO_2
 2. Right ventricular SaO_2
 3. Left atrial SaO_2
 4. Normal arterial blood gas (ABG) values for the neonate at birth and 24 hours later
 5. Normal hemoglobin value in the fetus
 9. Summarize the circulatory changes that occur during a normal birth.
 10. Explain three reasons why the fetus can survive in utero with PaO_2 values of about 29 mmHg.
3. Summarize and categorize methods of assessing prenatal and perinatal history.
 1. Interpret the significance of gravida and para with regard to maternal reproductive history.
 2. Explain how each of the following prenatal risk factors contributes to infant mortality and morbidity:
 1. Previous preterm/low birthweight delivery
 2. Maternal diabetes
 3. Twins
 4. Polyhydramnios
 5. Oligohydramnios
 6. Placental insufficiency
 7. Compressed umbilical cord
 8. Abruptio placenta and placenta previa
 9. Prolonged rupture of membranes (PROM)
 10. Maternal infections
 11. Prematurity
 12. Maternal drug exposure
 13. Maternal cigarette smoking
 14. Cesarean section
 3. Discuss the role of prenatal care in minimizing these prenatal risk factors.
 4. Outline pregnancy-induced hypertension (PIH) and its effect on the fetus in its clinical manifestation as:
 1. PIH
 2. Severe pre-eclampsia
 3. Eclampsia
 5. Explain the following tests used to monitor/evaluate the condition of the fetus during pregnancy and labor:
 1. Nonstress test
 2. Stress test
 3. Ultrasound
 4. Fetal blood pH
 5. Fetal heart rate decelerations during labor
 1. Early, late, and variable
4. Interpret signs of cardiopulmonary distress in a newborn and relate these to arterial blood gas measurements.

1. Discuss the following with regard to the Ballard Score system:
 1. Purpose
 2. Parameters assessed
2. Describe the APGAR (Appearance, Pulse, Grimace [reflexes] Activity [muscle tone] and Respiratory effort) scoring system:
 1. Purpose
 2. Parameters assessed (5) and the point values associated with each of them
 3. Time intervals after birth
 4. Actions to be taken based on the total APGAR score
3. Discuss the following with regard to the Silverman Scoring system:
 1. Purpose
 2. Parameters assessed and the point values associated with each
5. Analyze and discuss the etiology, pathophysiology, clinical manifestations, and laboratory data in order to select the appropriate respiratory therapy and pharmacological treatment modalities.
 1. Describe and explain the etiology and pathophysiology for each of the following:
 1. Respiratory distress syndrome (RDS)
 2. Bronchopulmonary dysplasia (BPD)
 3. Persistent pulmonary hypertension of the newborn (PPHN)
 4. Epiglottitis
 5. Croup
 6. Bronchiolitis
 2. Compare and contrast the clinical manifestations and laboratory data for each of the following:
 1. RDS
 2. BPD
 3. PPHN
 4. Epiglottitis
 5. Croup
 6. Bronchiolitis
 3. Describe the respiratory therapeutic modalities and pharmacological treatment for each of the following:
 1. RDS
 2. BPD
 3. PPHN
 4. Epiglottitis
 5. Croup
 6. Bronchiolitis
6. Describe and classify several congenital cardiopulmonary anomalies in the newborn.
 1. Differentiate the manifestation, diagnosis, and treatment of the following congenital pulmonary anomalies:
 1. Choanal atresia
 2. Congenital laryngeal stridor
 3. Diaphragmatic hernia
 4. Esophageal atresia
 2. Explain the manifestation, diagnosis, and treatment of the following congenital cardiac anomalies:
 1. Patent ductus arteriosus (PDA)
 2. Atrial septal defect (ASD)
 3. Ventricular septal defect (VSD)
 4. Coarctation of the aorta
 5. Tetralogy of Fallot
 6. Truncus arteriosus
 7. Complete transposition of the great vessels
 8. Anomalous venous return
7. Explain the use of artificial airways in neonatal and pediatric patients.
 1. Discuss methods to select the appropriate sized internal diameter of endotracheal tubes for neonatal/pediatric patients.
 2. Explain ways to approximate proper placement of the tip of the endotracheal tube within the neonatal/pediatric trachea.
 3. Demonstrate the technique used to secure an oral endotracheal tube on a neonatal patient.
 4. Compare and contrast neonatal and pediatric tracheostomy tubes.
 5. Explain the goal of suctioning in the premature neonate and contrast this to the goal of suctioning infants and children.
8. Describe and classify the use of various oxygen delivery devices in the newborn and pediatric patients.
 1. Explain the range of FIO₂s, minimum flow rate, and overall advantages and disadvantages for selected oxygen delivery devices.
9. Describe and classify the use of various continuous positive airway pressure (CPAP) devices, pressure-limited ventilators, and volume ventilators.
 1. Summarize the clinical application of CPAP according the American Association for Respiratory Care (AARC) Clinical Practice Guidelines.
 2. Discuss the clinical application of mechanical ventilation according the AARC Clinical Practice Guidelines.
10. Describe and compare the indications, dosage, and application of therapeutic administration for the use of surfactant replacement therapy.
 1. Illustrate and explain the administration of exogenous surfactant according to the AARC Clinical Practice Guidelines.
11. Interpret the clinical indications for cardiopulmonary resuscitation, and describe the procedure.
12. Interpret the clinical indications and describe the application for mechanical ventilation for neonatal and pediatric patients.

1. Discuss the rationale and use of various modes of mechanical ventilation.
2. Explain the rationale and use of withdrawal methods for weaning from mechanical ventilation.
13. Interpret the clinical indications for the use of selected advanced techniques for neonatal life support.
 1. Illustrate and explain the rationale and use of high frequency ventilation in the neonatal population.
 2. Describe and explain the rationale and use of extracorporeal membrane oxygenation (ECMO) in the neonatal population.

Evaluation Criteria/Policies:

Students must demonstrate proficiency on all CCPOs at a minimal 75 percent level to successfully complete the course. The grade will be determined using the Delaware Tech grading system:

92	-	100	=	A
83	-	91	=	B
75	-	82	=	C
0	-	74	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

Final Course Grade:

Calculated using the following weighted average

Evaluation Measure	Percentage of final grade
Summative: Unit Exams (equally weighted)	60-80%
Formative: Summary paper (neonatal therapeutic techniques)	5-10%
Summative: Cumulative Final	15%
Formative: quizzes	5-10%
TOTAL	100%

Core Curriculum Competencies (CCCs are the competencies every graduate will develop):

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):

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1. Apply theoretical information that leads to an appropriate action in the application or delivery of respiratory care procedures.
2. Perform technical skills in the implementation of respiratory care procedures within a plan of care.
3. Practice behaviors that are consistent with professional and employer expectations/requirements of their employees.

Disabilities Support Statement:

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.