

Fall 2015

# EES 4096

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*University of New Orleans*

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**EES 4096 Fall 2015 Syllabus**

**820/15**

**Course Title: Reproductive and Developmental Toxicology**

**Department: Earth and Environmental Sciences**

**Professor: Patricia M. Williams, Ph.D. DABT**

**Office: 312 CERM Building, Lakeshore Drive, Research and Technology Park**

**Office hours 2:45-3:45 pm Tuesdays or by appointment**

**Phone: office 504-280-5543**

**e-mail: [pmwilli3@uno.edu](mailto:pmwilli3@uno.edu)**

**3 hour lecture course (3 hr credit)**

**Lectures on Monday 5:00 pm – 7:45 pm**

**Room: Geology and Psychology Bldg 1023 (lecture)**

### **Course Description:**

3 cr. *Prerequisite: Consent of Department.* Reproductive and Developmental Toxicology is a study of classical embryology and the gestational vulnerability of the developing embryo and fetus to toxic insults. Although the focus is on human embryology, the course also covers other species that provide wildlife and experimental examples of the impact of teratogens and developmental toxicants. Toxicants studied range from essential nutrients and vitamins, pharmaceuticals, and environmental pollutants. Errors in reproduction and development are the result of the interplay between external factors and intrinsic molecular, physiological, and anatomic targets. Complicating the time-related insults is the appearance or disappearance of target tissues and cellular receptors, as well as the ever-changing physiologic and anatomic state of specific organs and tissues. The role of the yolk sac and placenta in the absorption, distribution, and storage of toxicants is important to understand potential hazards to the developing organism. The student will have a basic understanding of human embryology and the time-related windows of vulnerability of the developing organism during gestation. Sentinel events in other species will be presented, such as Imposex in molluscs caused by tributyltin, endocrine disruption in fish resulting in sex reversal opposite to that of the genotypic sex of the individual, and malformations in seabirds from organochlorine pesticides. The relevance of these events to mechanisms in human reproduction and development is discussed.

### **Lecture Syllabus:**

8/24/15 Introduction: explanation of syllabus and grading format; Introduction to Developmental Toxicology; (Assigned Reading: Chapters 1 and 2)

8/31/15 First Week of Human Development (Assigned Reading: Chapter 3) Toxicant Vulnerability.

9/7/15 Labor Day Holiday --no class

- 9/14/15 Second Week of Human Development (Assigned Reading: Chapter 4)  
Toxicant Vulnerability
- 9/21/15 Third Week of Human Development (Assigned Reading: Chapter 5)  
Toxicant Vulnerability
- 9/28/15 No Class—Environmental Mutagenesis and Genomics Society Meeting—  
students invited
- 10/5/15 **Exam # 1 (Lectures 8/24/15 through 9/21/15)**
- 10/12/15 Fourth to Eighth Weeks of Human Development (Assigned Reading: Chapter  
6); Toxicant Vulnerability
- 10/19/15 Ninth Week to Birth: The Fetal Period (Assigned Reading: Chapter 7)  
Toxicant Vulnerability  
**Topics Due for Written Paper**
- 10/26/15 Placenta and Fetal Membranes (Assigned Reading: Chapter 9)  
Toxicant Vulnerability
- 11/2/15 Pharyngeal Apparatus, Face and Neck (Assigned Reading: Chapter 14)  
Toxicant Vulnerability  
**Outline Due for Written Paper**
- 11/9/15 Development of Skeletal System (Assigned Reading: Chapter 17)  
Toxicant Vulnerability
- 11/16/15 **Exam #2 (Lectures 10/12/15 through 11/2/15)**
- 11/23/15 Development of Nervous System (Assigned Reading: Chapter 20)  
Toxicant Vulnerability
- Thanksgiving Holidays November 26-27
- 11/30/15 Human Birth Defects; Toxicant Vulnerability  
Presentation of Graduate Student Paper  
**(Written Reports Due)**
- 12/7/15 **Final Lecture Exam 5:30-7:30 pm (Lectures 11/9/15 through 11/30/15)**

**Required Text: The Developing Human: Clinically Oriented Embryology, Keith L. Moore, TVN Persaud, Mark G. Torchia; Elsevier/Saunders; 9<sup>th</sup> Edition; 2013, Philadelphia, PA**

**Reference Texts:** Klaassen, Curtis D., Editor. Casarett and Doull's Toxicology: The Basic Science of Poisons. 8<sup>th</sup> Edition, New York: McGraw-Hill Companies, Inc., 2013

Developmental and Reproductive Toxicology, Ronald D Hood ed., Informa, Third Edition, 2012, London, UK.

Reproductive and Developmental Toxicology, Ramesh C Gupta, Elsevier, 2011, Boston.

Reproductive and Developmental Toxicology, Kenneth S. Korach, Marcel Dekker, Inc., 1998, New York.

Handbook of Developmental Toxicology, Ronald D. Hood, CRC Press, 1996, Boca Raton, New York.

**Grading:**

Students will be assessed using exams, written reports, and oral presentations (by graduate students only). The written reports will reinforce the materials presented in lecture. During the semester, three exams will be administered representing 75% of the student's total grade:

<b>FIRST EXAM</b>	<b>25 %</b>
<b>SECOND EXAM</b>	<b>25 %</b>
<b>FINAL EXAM</b>	<b>25 %</b>
<b>WRITTEN REPORT</b>	<b>25 %</b>

All lecture exams are multiple choice. Item analysis is performed for quality assurance. The Final exam is not a cumulative exam. Bonus questions are provided. Failure to take any of the lecture or laboratory exams on the scheduled date and time will not be excused without a valid University excuse (illness of the student, or of an immediate family member, death of an immediate family member, participation on trips related to certain University functions, major religious holidays).

**All** students will be required to complete a **written report** on an instructor-approved topic that is chosen from a list which is relevant to the course. Only peer-reviewed journal articles, review articles, or Toxicology textbooks will be acceptable references. Topics must be approved by Course Professor by March 17th. Grading for this report will be 25% of the final grade. **Graduate students** will **present** their **reports orally as well as written**. **The oral presentation and written report will be averaged for the 25% grade for the report.** Oral presentations must be in a Power Point format. Written papers must be 7-10 pages in length not including figures and references. Topic for paper and presentation due on October 19, 2015. An outline of the paper will be due by November 2, 2015. Failure to turn in an outline by November 2, 2015 will result in a 5 point reduction from the written paper grade.

The following assignment deadlines must be met:

- **Topic for written report and presentation due October 19, 2015.**

- **Written outline due November 2, 2015.**
- **Written Graduate and undergraduate student reports are due on November 30, 2015. Graduate Student Oral Presentations also on November 30, 2015.**

Any report turned in after the specified due date (at the beginning of class) will be considered late, and will be graded with a 20% penalty. A report that is not handed in by midnight of the day it is due, will not be accepted without a valid University excuse (illness of the student, or of an immediate family member, death of an immediate family member, participation on trips related to certain University functions, major religious holidays). Written papers must be handed in as a hard copy at the beginning of class, any other form will result in a late penalty of 20%. In addition to the late penalty of 20%, an additional penalty of 10% per additional 24 hour day will be instituted for reports later than midnight of the day the assignment is due.

Attendance is mandatory at the Graduate student presentations and absence will result in a 20 point deduction from the final written report grade. Students who do not make their presentations will receive a zero for the oral presentation grade.

**Grading Scale**

90 – 100	A
80 - 89	B
70 – 79	C
60 - 69	D
below 60	F

**Academic Dishonesty (edited from the UNO Policy Manual):**

Fundamental to the learning process and evaluating academic performance is academic honesty. Maintaining such integrity is the responsibility of all members of the University. All faculty members and teaching assistants should encourage and maintain an atmosphere of academic honesty. They should explain to students the regulations defining academic honesty and the sanctions for violating these regulations. However, students must share the responsibility for creating and maintaining an atmosphere of honesty and integrity. Students should be aware that personally completing assigned work is essential to learning. Students who are aware that others in a course are cheating or otherwise committing academic dishonesty have a responsibility to bring the matter to the attention of the course instructor and/or academic unit head, or the Assistant Dean. Academic dishonesty includes, but is not limited to, the following: cheating, plagiarism, academic misconduct, falsification/fabrication, and being an accessory to acts of academic dishonesty.

**University Commitment on Disability Services**

The University of New Orleans (UNO) is committed to providing for the needs of enrolled or admitted students who have disabilities under Section 504 of the Rehabilitation Act of 1973 and the Americans with disabilities Act of 1990 (ADA). In general, University policy calls for reasonable accommodations to be made for students with documented disabilities on an individualized and flexible basis. It is the responsibility of students, however, to seek available assistance at the University and to make their needs known.

### **University Policy on Sexual Harassment**

Sexual harassment is unacceptable behavior and will not be tolerated. Sexual harassment is a violation of state and federal law. Sexual harassment has a negative impact on the functioning of the University. Consequently, all members of the University community must be sensitive to the possibility of sexual harassment whether intended or inadvertent. Individuals must recognize this potential and act to prevent it. When sexual harassment has occurred, the University shall take effective and expeditious action.

### **University policy on Religious holidays for which the University is not closed**

The University of New Orleans permits students who observe religious holidays without an academic penalty. Alternative arrangements with students who request permission to observe such holidays will be granted. It is the student's responsibility to make such a conflict of course schedule known to the instructor at the beginning of the semester so that alternate arrangements for exams may be met with fairness to all students.

### **Course Attendance**

Attendance at class is mandatory. Power point lecture slides will not be provided to those with unexcused absences. Attendance Roll will be taken at each class. Consequences of non-attendance will fall on the student to make up all class work and exams and obtain all class handouts/notes from other class attendees . Do not request missed information from the instructor.

### **Make-up Exams**

An exam that is not taken on the scheduled date may be excused by the instructor for extenuating circumstances and with documentation to support the reason for the excuse. A written request for the make-up exam with support documentation must be provided to the instructor on the first day of return to the University for classes. If the absence from the exam does not warrant an excused absence, the grade for the missed exam will be zero. If the absence is excused with support documentation of the emergency/urgent need for the absence, then a cumulative course makeup exam will be given after the last laboratory class on April 30th. The make-up exam for an excused absence will be administered at the end of the semester as a cumulative makeup exam for the entire course. It is the student's responsibility to notify the instructor of the reason for non-attendance of the exam no later than the student's first day of return to classes at the University. Do not assume that the exam will be excused prior to receiving the instructor's review of support documentation. The instructor shall be notified by e-mail and cell phone (504-915-1817) as to the date of return to classes at the University by the student. Only one excused absence for a missed lecture exam will be issued for extenuating circumstances with support documentation. If support documentation is not provided for the missed exam or the excuse is not of an emergency/urgent nature, the exam will not be excused and no makeup exam will be given to the student. A grade of zero will then be assigned. If a second exam is missed, the grade will be zero. There will be no make-up lecture exam for a second missed exam. There are no laboratory make-up exams. The lowest grade for laboratory exams is dropped. If there is a missed laboratory exam, that will be the dropped grade. If there is a second missed laboratory exam, a grade of zero will be entered for that exam. Because of the nature of a make-up exam and the extended time for study, no item analysis and no bonus questions are provided.

### **Office Hours**

Office hours for student consultation will be conducted at 312 CERM from 2:45 to 3:45 pm on Tuesday. Other consultation by appointment.

e-mail address: [pmwilli3@uno.edu](mailto:pmwilli3@uno.edu)

office phone: 504-280-5543

cell phone: 504-915-1817

**Course Objectives and Student Learning Goals:**

**At the completion of the course, the student will be able to:**

- 1. Describe the Gestational stages of Embryo and Fetal Development**
- 2. Describe the morphological and histology development of the Embryo and Fetus**
- 3. Recall and recognize the six General Principles of Teratology**
- 4. Describe Mechanisms and Pathogenesis of Developmental Toxicity**
- 5. Explain levels of mechanistic inquiry for Developmental Toxicity**
- 6. Understand the structure of embryonal stages and toxicant vulnerability**
- 7. Understand the structure of organ systems of the fetus and toxicant vulnerability**
- 8. Discuss various toxicants capable of producing Fetal Birth Defects**
- 9. Describe various toxicants capable of producing Spontaneous Abortions, Still births and Fetal Deaths.**