CHEM 6529: Microtoxicity and Biochemistry
School of Natural Sciences
Farleigh Dickinson University, Teaneck Campus

General Information:
Semester: Fall 2009
Day/Time: Tuesday / 5:25 p.m. – 8:00 p.m.
Room: DH 1105
Prerequesite: B.S. degree in allied science
Instructor: Dr. Roger L. McMullen, rmcmullen@fdu.edu
(roger.mcmullen@gmail.com)

Course Description:
This course aims to provide students with an overview of core biochemistry concepts which consists of a thorough description of the eukaryotic cell as well as a description of biologically important processes and molecules (amino acids, proteins, lipids, nucleic acids, and carbohydrates). A significant portion of the course will also be dedicated to biochemical concepts as related to contemporary concepts in cosmetic science. Mostly, this will focus on the anatomical and physiological structure of the three components of the human integuement (hair, nail, and skin) and the skin immune system. A discussion of the influence of UV light on skin and hair will also be introduced. In addition, an introduction will be provided about key molecules that interact with the skin, such as α-hydroxy acids, peptides, antioxidants, etc.

Objective:
Upon successful completion of this course, students will be familiar with basic concepts of biochemistry, which include an understanding of the components of the eukaryotic cell, protein structure and function, lipid biochemistry, and biosignaling. The students will also be introduced to basic concepts of nucleic acid chemistry as well as protein expression. Students will gain a thorough knowledge of the structure and function of the human integuement (hair, nail, and skin). Students will also understand the functions of the skin immune system as well as the biochemistry of cosmetic ingredients that influence skin structure and function.

Format:
Mandatory Attendance
You are expected to attend every lecture. Attendance will be taken and contribute toward your grade. There will be NO MAKEUPS FOR MISSED EXAMS. Consideration will be given only in the case of a documented and unavoidable company travel, business obligation, or medical emergency.
Homework
Homework assignments will be given randomly throughout the semester and must be turned in on time.

Research Paper
You will be expected to complete a term paper that reviews some aspect of biochemistry in cosmetic science. This will be accomplished by selecting 3 research papers from the current literature (e.g. Journal of Investigative Dermatology or other relevant journals). Your topic and sources need to be approved by the instructor by Week 4 of the semester. The finished paper will be due at the end of the semester, the exact date to be determined. The paper will consist of the following sections: Abstract, Introduction, Methods, Results & Discussion, and Conclusion. A handout will be provided at the beginning of the semester to provide more guidance about the Research Paper requirements.

In-class Presentation
You will be expected to give a presentation and critical evaluation of a research paper published in the current literature (e.g. Journal of Investigative Dermatology). The presentation should be approximately 10 minutes and should be completed in MS Powerpoint or another suitable presentation software program and include figures. A detailed handout will be handed out to provide more precise guidelines for this project. We will schedule the presentations in the first two to three weeks and (depending on the number of students in the class) the presentations will given by the students beginning in Week 5 (please note that this date is tentative).

Quizzes
Quizzes will be given throughout the semester and may be as frequent as once a week at the Professor's discretion. Quizzes will be unannounced and may cover any material covered up to the date that the quiz is administered. You will be able to drop your lowest quiz score; the remaining quiz scores will be computed into your final grade.

Exams
There will be a midterm exam as well as a cumulative final exam given during finals week.

Grading Policy:
- Midterm Exam - 25%
- Final Exam (cumulative) - 25%
- Research Paper - 15%
- In-class Presentation - 15%
- Quizzes - 20%

Course Outline:
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<thead>
<tr>
<th>Week #</th>
<th>Expected Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>The Foundations of Biochemistry</td>
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<tr>
<td>2</td>
<td>Water</td>
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<tr>
<td>3</td>
<td>Amino Acids, Peptides, and Proteins</td>
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<td>4</td>
<td>The Three-Dimensional Structure of Proteins/ Nucleotides and Nucleic Acids</td>
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<td>5</td>
<td>Carbohydrates and Glycobiology</td>
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<td>6</td>
<td>Lipids/Biological Membranes and Transport</td>
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<td>7</td>
<td>Midterm Exam</td>
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<tr>
<td>8</td>
<td>Physiology and Biochemistry of Skin</td>
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<td>9</td>
<td>Collagen/Elastic Fibers/Basement Membranes/ The Role of Extracellular Matrix Metalloproteinases in Connective Tissue Remodeling/Proteoglycans and Glycosaminoglycans of Skin</td>
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<tr>
<td>10</td>
<td>Hair Structure and Biochemistry</td>
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<td>11</td>
<td>Hair Follicle Biochemistry/Biology of Melanocytes</td>
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<td>12</td>
<td>Nail Structure and Biochemistry</td>
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<td>13</td>
<td>Immunological Function of Skin/Antioxidants</td>
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<td>14</td>
<td>Effects of Cosmetic Treatments on Skin Biochemistry</td>
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<td>15</td>
<td>Final Exam</td>
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Lecture schedule is subject to change based on class pace.

**Please Note:**

**Academic Integrity**
Cheating, in any form, will not be tolerated. Students caught cheating will receive a zero grade for that particular assignment. Details regarding FDU’s Academic Integrity policy are readily available on-line at http://view.fdu.edu/default.aspx?id=211.

**Cell Phones**
All electronic devices including cell phones, MP3 players, etc. should be turned off during lecture and exam periods.