Cancer Biology Syllabus
BIO 311

Course Instructor: Dr. Roslyn N. Crowder

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Email: rcrowder@mail.med.upenn.edu

Office Location: Science Building Room 334

Office Hours: TBA

Textbooks:


2. *Reading Primary Literature: A Practical Guide to Evaluating Research Articles in Biology* by Christopher M. Gillen. Benjamin Cummings

Prerequisites: BIO 103 and BIO 104

Course Description:

This Cancer Biology course will educate students on various genetic and molecular changes normal cells undergo during transformation into malignant cancer cells. These modifications include unregulated cell proliferation, evasion of cell death, and metastasis. This course will describe factors that contribute to cancer development and discuss cancer prevention and currently available therapeutic treatments.

Student Learning Outcomes

*Content Outcomes – at the conclusion of this course, students will be able to:*

- Describe the six hallmarks of cancer
- Explain the types of gene mutations possible and how these mutations can contribute to cancer formation
- Describe an oncogene and why it is important in cancer development
• Explain the cell cycle, its regulation, and how cell cycle dysfunction can lead to cancer
• Describe the function of tumor suppressor genes
• Explain how external or internal stimuli can lead to apoptosis
• Clarify how cancer cells escape cell death
• List and describe the steps that lead to metastasis
• Give details on how chronic inflammation and infectious agents can lead to cancer
• Explain the role of diet in cancer development and cancer prevention

**Skill Outcomes - at the conclusion of this course, students should be able to:**

• Identify the major components of scientific journal articles
• Interpret data published in scientific journal articles
• Analyze and critique, in written and oral form, published cancer biology articles
• Organize data and information for presentation
• Make oral presentations of experimental results

**Classroom Policies**

• Students are expected to attend all lectures.
• If you are absent, it is your responsibility to contact me in a timely manner. Otherwise, absences will be regarded as unexcused.
• Students with 4 or more unexcused absences will fail the course.
• 3 late arrivals count as one absence.
• Assignments are due at the beginning of class. Late assignments will be accepted up to one week after initial due-date. **Five** points will be deducted daily.
• Cell phones should be turned off while in class.
• Quizzes will be given within the first 15 minutes of class. If you are late and miss the quiz, you cannot make-up the quiz.
• Make-up exams will only be given for excused absences. Supporting documentation will be required.
**Academic Integrity**

Cheating and plagiarism will not be tolerated. If you are unclear what actions constitute plagiarism, it is your responsibility to ask. The following website discusses acts of academic dishonesty and plagiarism and the subsequent sanctions that will apply: [www.lincoln.edu/registrar/AcademicIntegrity.pdf](http://www.lincoln.edu/registrar/AcademicIntegrity.pdf). To summarize, first time offenses will result in failure of the assignment. Subsequent offenses will be reported to the University and may result in failure of the course or expulsion.

**Student Disabilities**

Students with learning, physical, or psychological disabilities, as defined by the Americans with Disabilities Act (ADA), should contact and register with Disability Student Services in the Office of Student Affairs. After registration with Disability Student Services, I will then be informed of the special accommodations to support your learning environment. Disability Student Services is located in the Office of Student Services in Lincoln Hall Room 103. The Office of Student Services is open Monday thru Friday from 9AM to 5PM. The Office of Student Services can be reached at 484-365-7214.

**Grading**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
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<tbody>
<tr>
<td>3 Exams @ 100 pts</td>
<td>300</td>
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<tr>
<td>6 Pop Quizzes @ 10 pts (lowest will be dropped)</td>
<td>50</td>
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<tr>
<td>1 Group Oral Presentation</td>
<td>100</td>
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<tr>
<td>2 Journal Article Written Analysis @ 100pts</td>
<td>200</td>
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<tr>
<td>1 Cumulative Final Exam</td>
<td>150</td>
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<td><strong>TOTAL</strong></td>
<td><strong>800</strong></td>
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**Designation of Grades**
A = 100-90%
B = 89-80%
C = 79-70%
D = 69-60%
F = below 60%

Class Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 6-8</td>
<td>Chapter 1- Introduction</td>
<td>1-18</td>
</tr>
<tr>
<td>2</td>
<td>Jan 11-15</td>
<td>Chapter 2- DNA Structure &amp; Stability</td>
<td>21-45</td>
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<td>3</td>
<td>Jan 18-22</td>
<td>Chapter 3- Gene Expression Regulation</td>
<td>47-67</td>
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<td>4</td>
<td>Jan 25-29</td>
<td>Chapter 4- Growth Factors &amp; Oncogenes</td>
<td>69-93</td>
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<td>5</td>
<td>Feb 1-5</td>
<td>Exam I; Chapter 5- Cell Cycle</td>
<td>95-111</td>
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<tr>
<td>6</td>
<td>Feb 8-12</td>
<td>Chapter 6- Growth Inhibition &amp; Tumor Suppressor Genes</td>
<td>113-135</td>
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<tr>
<td>7</td>
<td>Feb 15-19</td>
<td>Presentations; Chapter 7- Apoptosis</td>
<td>137-157</td>
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<tr>
<td>8</td>
<td>Feb 22-26</td>
<td>Chapter 7- Apoptosis continued; Presentations</td>
<td>137-157</td>
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<tr>
<td>9</td>
<td>March 1-5</td>
<td>Chapter 8- Stem Cells</td>
<td>161-182</td>
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<tr>
<td>10</td>
<td>March 8-12</td>
<td>Presentations; Exam II</td>
<td>N/A</td>
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<tr>
<td>11</td>
<td>March 15-19</td>
<td>Chapter 9- Metastasis</td>
<td>185-209</td>
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<tr>
<td>12</td>
<td>March 22-26</td>
<td>Chapter 10- Infections &amp; Inflammation</td>
<td>211-229</td>
</tr>
<tr>
<td>13</td>
<td>March 29- April 2</td>
<td>Chapter 11- Nutrients, Hormones, &amp; Gene Interactions</td>
<td>231-255</td>
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<tr>
<td>14</td>
<td>April 5-9</td>
<td>Exam III, Chapter 12- Drug Development &amp; Clinical Trial Design</td>
<td>259-272</td>
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<tr>
<td>15</td>
<td>April 12-16</td>
<td>Chapter 13- Cancer in the Future; Review for Final</td>
<td>276-294</td>
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<tr>
<td>16</td>
<td>April 19-23</td>
<td>Final Exam: Date &amp; Time TBA</td>
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Journal Article Analysis
Each student will be assigned a published peer-reviewed cancer biology journal article to analyze. The analysis will be due **two weeks** after the date the article was received. The analysis must be typed. The analysis should be 2-4 pages in length (1.5 line spacing). The analysis must include the following:

- **Title page**- Include name, date, course title and number, instructor, title of article, authors
- **Introduction**- Summary of what the article is about; How is the work novel? What questions are the authors trying to answer?
- **Methods**- Describe the experimental design of the study and any model systems used
- **Results**- Present the experimental findings of the authors
- **Discussion**- Discuss the results presented by the authors and state whether the results were expected or unexpected
- **Conclusion**- What have you learned from the article? Do you feel the article was well written? How should the article be modified?

Do not plagiarize. Use quotes and citations if you are going to use the authors’ words.

**Group Presentation**

Each group will consist of 3-4 students. Each group will be assigned a published peer-reviewed cancer biology journal article to analyze. The analysis will be presented orally during class. Articles will be assigned at least two weeks prior to the date of presentation. Presentations should be prepared in PowerPoint. Each presentation will be approximately 15 minutes long. There will be a 5 minute Question and Answer period following the conclusion of each presentation. The presentations must include the following:

- **Title slide**- Include names of group members, date, title of article, authors’ names, journal title
- **Background**- Include pertinent background information so the audience will be able to follow the presentation easily. Example: If your article discusses lung cancer, I would expect you to include some general statistics on this type of cancer and current treatments used.
- **Methods**- Explain what methods were used in the article
- **Results**- Present each figure separately. Explain what experimental question the authors are trying to address
- **Conclusion**- What conclusions did the authors make?