BIOL4304  Biology of Viruses   SPRING 2009  v12

TEXAS A&M UNIVERSITY—CORPUS CHRISTI
COLLEGE OF SCIENCE & TECHNOLOGY

Lecture & Discussion: Thursdays 7:00-9:30 pm   ST 107

Instructor: Gregory W. Buck, Ph.D.  Office—CS251; Gregory.Buck@tamucc.edu
Tel 361.825.3717   Office Hours: Mon Wed 10:00 a.m.-11:00 a.m., Tues Thurs 1:00 p.m.-2:00 pm  Other days & times--preferably by appointment.

Prerequisites:  BIOL 2416; BIOL 2421 & CHEM 1311; CHEM 1312, CHEM 3411-12, BIOL 3403, BIOL 4406, and CHEM 4301/4302 highly recommended

Course Description: This course is designed for those students majoring in Biology or Biomedical Sciences, and may be considered as “pre-grad school.” This course entails a survey of major animal viruses, bacteriophages, and some plant viruses that cause disease. The course will cover classification of viral groups, methods of viral replication, pathogenesis, and will also describe emerging viral diseases. Please see the course schedule for the outline of topics to be covered. The course is not designed to cover medical aspects of virology and taxonomy described in professional school (MD, DO, DVM, DDS), nor viral treatment modalities.


References:
These may be of some help for those who wish to read more background; undergrads are not responsible for them.

14. [http://www.virology.net/garryfavweb.html](http://www.virology.net/garryfavweb.html); Dr. David Sander’s “All the Virology on the Web” site; fairly accurate; accessed 01/14/09
15. [http://www.virology.net/Big_Virology/BVHomePage.html](http://www.virology.net/Big_Virology/BVHomePage.html); accessed 01/14/09

**Student Learning Outcomes--**
Upon completion of this course, students will be able to:
1. Describe the structure and components of viruses;
2. Explain various cellular and molecular biology techniques used in virology;
3. Describe the different classification schemes of viruses;
4. Distinguish between various types of viral replication between positive and negative-stranded DNA or RNA viruses (Baltimore classification);
5. Explain the molecular basis of pathogenesis for diseases caused by selected viruses;
6. Describe emerging viral etiological agents;
7. Critique scientific methodology and approaches in studying the etiology of viral infectious agents;
8. Refine skills in critical thinking and writing through analyzing current primary literature;
9. In a group project, synthesize knowledge of experimental design, molecular techniques, and of viruses to justify a hypothetical but scientifically-plausible extension of ideas presented from viral primary literature on a virus not presented in class.

**Attendance:** Students are expected to attend every scheduled class meeting. It is the responsibility of the student to obtain any material missed during an absence from his/her classmates. I do not copy and print out Power Point slides. Taping of lectures is permitted with prior permission of instructor. Family events and celebrations of your 21st birthday are worthwhile, but are not classified as excused absences. An airplane flight before Spring Break is NOT an excused absence. In general, only unavoidable absences are excused (major family illness or accidents, deaths, funerals). Other events (professional school and job interviews) will be determined on a case-by-case basis. A note from a doctor, dentist or funeral director is necessary to receive an excused absence. All notes should be received within one week of the absence.
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**Academic Integrity:** TAMUCC academic policies are in force, including standards for academic integrity & honesty, plagiarism, grammar and spelling; these policies are described in the TAMUCC catalogue and the Code of Conduct in the Student Handbook. References must be properly cited using the Council of Biology Editors (CBE) style.

Modifications (e.g., ASM versus NEJM) are irrelevant, provided that all references are consistent. Failure to cite references (even web sites) constitutes plagiarism. The instructor will determine if plagiarism was intentional or unintentional; the former will result in a zero for the assignment; the latter will result in reduced credit. **Faculty members also have to report instances of cheating or plagiarism to the Dean of Students office on an Academic Misconduct form.** Professor does have access to Turnitin© plagiarism detection software.

**Professional courtesy:** Please turn off all cell phones, beepers, iPhones, BlackBerrys, Palm Pilots, etc., before entering the classroom or laboratory, or at least place them on silent mode.

**List-serve:** All students must subscribe to two list-serves. One list-serve allows the instructor to give you notes and send messages; this list-serve is the Virology list-serve, biol4304-list@sci.tamucc.edu. Another list-serve describes opportunities available in science. To subscribe, send a separate e-mail to both biol4304-list-request@sci.tamucc.edu and to opportunities-list-request@sci.tamucc.edu. Make sure that your e-mail appears in the “From” heading. In the subject heading, type “subscribe,” then send the e-mail. Next, you will receive a second message with a long set of letters and numbers in the subject line. You **must also reply** to that message in order to be subscribed to the list-serve.

After the initial message to subscribe, to send items on the list-serve, just type biol4304-list@sci.tamucc.edu (do NOT add –request after list). You may not receive the messages from the list-serve if your Internet service provider (Yahoo, Hotmail, Excite, Roadrunner, Grande, etc.) filters these messages. You may have to adjust the filters on your inbox to keep these messages from being placed in junk-mail. Suggestion: Get a student account at tamucc.edu!

At the end of the course, if you want to unsubscribe to both list-serves, send an e-mail that contains your e-mail address in the “From” heading. In the subject heading, type ”unsubscribe,” then send the e-mail. I hope that students will continue to subscribe to opportunities-list@sci.tamucc.edu!

**Students with Disabilities:** The Students with Disabilities Center is located in the Student Services Center (361.825.5816). If you have special needs, please contact this center. I cannot make modifications without the center’s involvement, even if you show me your IEP. If you have mobility problems, please notify me so that assistance can be given in case of fire drills or emergencies.
Evaluation:
1. Two exams (200 pts.); these exams will be a mixture of short answer, essay, multiple choice (including Type K), descriptive T/F, and cases. Exams may be in-class or take-home. The final exam, which may or may not be cumulative, is optional for undergraduate students. Class exams are 75-90 minutes in length. The take-home exam will have a finite time limit outside of class. You are free to use any sources for the take-home exam, including any materials on-line, in the library, from your peers in the class. However, you are NOT free to ask faculty at TAMU-CC or elsewhere, graduate students here at TAMU-CC or elsewhere, or undergraduates who have previously taken this course. I also reserve the right to “split” the exams into take-home and in-class components. Missed exams will be allowed make-up only under approved TAMU-CC guidelines, and will be total essay, and will differ in format than the regular exams.

2. Paper Discussion (25 pts)—I expect everyone to be prepared to lead class discussions of primary journal articles. This activity is the main focus of the class! I will expect 2-5 randomly-chosen individuals to lead discussions each class, and I will grade these persons. To make sure people don’t rest after their time, I will also give quizzes to the class. I can ask all students to do more than one presentation, and take the higher grade of the multiple presentations. If you cannot lead the class when you are asked, I will give you another opportunity if there are valid emergency reasons (family illness or accidents, deaths, funerals). Other events (professional school and job interviews) will be determined on a case-by-case basis. For nonlegitimate excuses (as determined by professor), I may deduct 12.5 points for the discussion, and ask you to try again. Students can be asked to do more than one discussion.

3. Quizzes/Article summaries (75 pts tot)—I will give at least three (3) quizzes or article summaries, worth 25 pts. each. Quizzes may cover lecture material, primary journal articles, or reviews given in class. I reserve the option of giving 1-2 additional quizzes if students fail to do readings.

4. Group Pre-proposal (50 pts) and Poster Project (50 pts): I am requesting that students work in groups of 3 to 5 students to undertake a project on a virus not covered in class.
4a. Pre-proposal: Students will read several primary journal articles on viruses not covered in class, then choosing a virus for their project. The group will take a future aim from a primary journal Discussion section, and formulate one hypothesis on their virus. The group will write a four (4) page “pre-proposal,” in which they include a 250-word abstract, a Background section stating the major features of what is known about this virus, what is NOT known, why this dearth of information is important, formulate a hypothesis, and state 2 Specific Aims to test this hypothesis. They will also include a References section that is not exhaustive yet comprehensive. Students will be graded on a rubric for experimental design, plausibility, knowledge of virus, ability to synthesize and analyze, and on the level of cooperation and participation in the group project. Late pre-proposals are NOT accepted.
4b. Poster: Students will then do a poster presentation in A-IMRAD form. Posters are NOT to be printed out on the plotters, but instead students will purchase tri-fold display boards (36” x 48” or 91.4 x 122 cm) on which they can place their projects in Abstract-IMRAD form. Each student will be a co-author, and add the top three authors of the most seminal papers used for the project. Students will describe a detailed research plan in which they will use experiments to “test” this hypothesis, and give results based on what they have read in the literature, as well as a conclusion. Again, all team members will be graded on a rubric for experimental design, plausibility, knowledge of virus, ability to synthesize and analyze, and on the level of cooperation and participation in the group project. Students will be responsible for a 10 to 15 min group presentation of their project. **Late poster presentations are not accepted.**

Important dates for this project:
• The final date for choosing a virus is Jan. 29.
• The Pre-proposal is due Feb. 26.
• Poster presentations are on Apr 9, with Apr. 16 if not all oral presentations are completed.

Grade calculations
2 class exams@ 100 pts each =200 pts.
Minimum of 3 quizzes/article summaries = 75 pts.
Minimum of 1 paper discussion = 25 pts.
Pre-proposal = 50 pts
Poster presentation = 50 pts.
Optional final exam (not comprehensive) =100 pts.

Maximum 500 pts

**Grading Scale (out of total points)—Will NOT be adjusted**
A≥90% (450 pts)  B=80-89.9% (400-449.9 pts)  C=70-79.9% (350-399.9 pts)  D=60-69% (300-349.9 pts)  F<60% (<299.9)

**N.B: Instructor reserves the right to assign talks by visiting seminar speakers, give students a case history, as a make-up or extra credit.**

Important dates continued:
Grant Proposal topic due—Jan. 25
Exam 1—Feb. 15 (Note: Take-home portion, if done, may be given earlier)
Draft Due—Mar. 1
Exam 2—Mar. 8 (Note: Take-home portion, if done, may be given earlier)
Deadline to drop course with a “W” grade: F Apr 3
Final Paper Due—Apr. 12
Deadline to withdraw from University for the semester: M May 4
Final Exam (optional for undergrads)— T May 12 7:15-9:45 pm
Caveat: The syllabus is a general guide; deviations may be necessary. Responsibility to keep up with the changes in the syllabus lies with the student!

### Schedule of Topics Covered

WHBC=Wagner, Hewlett, Bloom, & Camerini, 3rd ed; C=Cann, 4th ed. Numbers refer to Chapters

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Text</th>
<th>Paper(s)</th>
<th>Notes</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan. 15</td>
<td>Introduction to Virology; Molecular methods in virology</td>
<td>1, 2, 5, 6, 14, 22-WHBC; 1, 3, 4-C</td>
<td>No paper</td>
<td>Also Appendix 2 (C) Students form groups for project</td>
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<td>2</td>
<td>Jan. 22</td>
<td>Viral Pathogenesis/ Immunology</td>
<td>3, 7, 8-WHBC; 6, 7-C</td>
<td>Steel et al. J Virol doi:10.1128/ JVI.01920-08 e-pub</td>
<td>Virus chosen for Pre-proposal and poster</td>
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<td>3</td>
<td>Jan. 29</td>
<td>ss/ds (+) RNA viruses</td>
<td>14-WHBC; 4-C</td>
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<td>4</td>
<td>Feb. 5</td>
<td>No Class</td>
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<td>10</td>
<td>Mar 19</td>
<td>Spring Break</td>
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<td>No Class</td>
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<td>11</td>
<td>Mar. 26</td>
<td>Plant Viruses &amp; Subviral agents</td>
<td>14-WHBC</td>
<td>Giles et al.(2008) Resistance of BSE to Inactivation</td>
<td>Case Study II</td>
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<td>13 Apr 9</td>
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<td>14 Apr 16</td>
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<td>Poster presentations if req;</td>
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<td>15 Apr 23</td>
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<td>16 Apr 30</td>
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<td>Emerging viruses &amp; bioterrorism</td>
<td>Ren et al. (2008) Viral Paratransgenesis PLOS Pathogens Aug 4(8) e1000135</td>
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<td>17 May 12</td>
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<td>Final Exam 7:15-9:45 pm</td>
<td>Mandatory for graduate students; optional for undergrads</td>
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