BIOL 5304.001 VIROLOGY Summer II 2014 v#2
TEXAS A&M UNIVERSITY—CORPUS CHRISTI
COLLEGE OF SCIENCE & ENGINEERING

Instructor: Gregory W. Buck, Ph.D. Office Phone: 361.825.3717
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Office Hours: M 10:00-11:15 a.m.; TWR 1:00-2:15 p.m. or by appointment.
Lecture: MTWR 8:00 am-9:55 am, O’Connor (OCNR) 145

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 M.S. students in Biology,
Microbiology, Molecular Biology, Environmental Sciences, Marine Biology or
Mariculture. This course will cover representative viruses in the three main groups of
viruses infecting bacteria, animals, and some plants. The course will cover classification
of viral groups, types of viral replication, molecular methods used to answer fundamental
questions in virology. Some elements of emerging viral diseases will be covered, and
students will be expected to know the molecular basis of pathogenesis (how viruses cause
disease), but the course does not aim to survey medical aspects of virology and taxonomy
described in professional school (MD, DO, DVM, DDS), nor viral treatment modalities.

Purpose: The course is offered to give graduate students a detailed survey of current
literature on molecular virology by reading, critically analyzing, and discussing primary
journal articles that focus on current virology research. Graduate students will also learn
how to teach complex information to undergraduate students. Finally, graduate students
will learn how to write a mini-grant in NIH format, a very useful skill for any future in
science.

Audience Defined: This course is for first-year M.S. students who have not previously
taken a course in virology at the college level.

Prerequisites: A general-level sophomore introductory course in microbiology (Texas
Common Course no. BIOL 2421 or its equivalent) using one of the following texts:
Alcamo, Baumann, Lin, Harley and Prescott, Nester et al., Madigan et al. Persons
having taken a mixed majors microbiology class (Common Course no. BIOL 2420) using
the texts of Batzinger, Talaro and Talaro, or Totora, Funke and Case will need to
supplement their knowledge base, and should discuss this with the instructor before
taking the course. Also required are courses equivalent to genetics (BIOL 2416) at the
level of Brooker, Hartl, Russel, Lewontin, Snustad or other texts, and organic chemistry
(CHEM 3412). While not required, coursework in molecular biology (BIOL 3403) at the
level of Watson, Weaver or Lewin; biochemistry (CHEM 4401/2) at the level of Stryer,
Voet, Lehninger, or Devlin; and immunology (BIOL 4406) at the level of Abbas and
Lichtman, Kuby, or Roitt would be of immense help.
Readings: One text is recommended; all others are strongly suggested. Please use Council of Science Editors citation style; you may find this in Bell Library. Note that the ISBN number is NOT part of the CSE bibliographic style. For web sites, the date accessed MUST be placed in the citation. Texts indicated with (#) are available in Bell Library; graduate students are expected to read additional journal articles referenced in the assigned articles, which I will send through Blackboard 9.1 or through the course listserv.

Bibliography (* indicates in TAMU-CC bookstore)—Please use this format when writing bibliographies for your grant proposals

Required Textbook for Graduate Students
ISBN 978-0-470-90059-8;

Suggested Texts for Graduate Students


Tropp BE. 2012. Molecular biology: genes to proteins, 4th ed. Boston: Jones and Bartlett. This textbook is suggested only if you have no familiarity with or background in molecular biology.

Suggested Readings:

26. [http://www.virology.net/garryfawweb.html](http://www.virology.net/garryfawweb.html); Dr. David Sander’s “All the Virology on the Web” site; fairly accurate; accessed 05/26/2014.

**Supplies/materials required (at student cost):** Textbook, tri-fold poster for poster presentation, copies of papers (do off library databases)—I will try to give copies of papers and place on Blackboard, but for clarity of figures, you may wish to get color copies from databases.
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 different techniques used in virology, along with their advantages and limitations;
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;
5. Explain the molecular basis of pathogenesis for diseases caused by selected viruses;
6. List 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. Write a credible, ORIGINAL grant proposal in NIH or NSF format;
10. Present and teach scientific material orally in a form appropriate to the targeted audience;

REQUIRED UNIVERSITY POLICIES
Students with Disabilities and Veterans: All programs in Life Sciences (LSCI) comply with the federal Americans with Disabilities Act (ADA) of 1990, including the ADA Amendments from 2008 (PL 110-325). This anti-discrimination statute provides civil rights protection for persons with disabilities. This statute requires that all qualified students with disabilities be guaranteed a learning environment that provides reasonable accommodations of their disabilities. This act also includes returning veterans who may be experiencing cognitive and/or physical access issues in the classroom or on campus. If you are a returning veteran or you suspect that you may have a disability requiring accommodation, please contact the Office of Disability Services (located in Driftwood 101) at (361) 825-5816. Please contact this office in a timely manner, as they must review requests and prepare accommodations and send the accommodation letters.

If you need disability accommodations in this class, please contact the instructor as soon as possible. If you have mobility problems, are pregnant, or you may have a history of seizures, please notify the instructor PRIVATELY so that assistance can be given in case of fire drills or emergencies. Please have your Faculty Notification Letter from the Disabilities Service Office when you talk with Dr. Buck.

Grade Appeals: As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University
Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible at the following sites:

University Rules
http://www.tamucc.edu/provost/university_rules/index.html

College of Science and Engineering Grade Appeals webpage (http://sci.tamucc.edu/students/GradeAppeal.html).

For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

**Academic Advising:** Graduate Students in the College of Science and Engineering should choose a Graduate Advisory Committee (GAC) Chair, and should form a Graduate Committee within 1-2 semesters of entry. Graduate students should have a degree plan filed, and approved by their GAC. The College's Academic Advising Center is located in CI Suite 350, and can be reached at (361) 825-6094. Please go to the College of Education Academic Advising Center if you are a teacher.

**Dropping the course:** Hopefully, you will not find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. *Please consult with me* before you decide to drop to be sure it is the best thing to do. However, you as adults have to be the final judge of your action whether to drop or not. For students applying to professional or graduate school, you will have to explain why you dropped this class or any other class. Receiving a “W” is NOT automatic; you must initiate the paperwork in the Student Services Center (the “Round Building”). Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class.
Deadline to drop course with a “W” grade: F July 25
Deadline to withdraw from University for the summer session: T Aug 5

**Academic Integrity:** University students are expected to conduct themselves in accordance with the highest standards of academic honesty, especially graduate students, who are obtaining an advanced degree for entry into a professional career. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a zero on the assignment. **We also have to report all instances of cheating to the Dean of Students office on an Academic Misconduct form.**

**Statement of Academic Continuity:** In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi, this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow
continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

If class is cancelled due to a pending hurricane, that information is sent via your islander.tamucc.edu account. It is strongly suggested that students have a functioning islan der.tamucc.edu account!! I will also try to send it within Blackboard 9.1, as stated above. I will not send out personal information regarding grades through other types of e-mail servers, only through islan der.tamucc.edu. Please make sure this account is working.

Statement of Civility: Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

CLASS POLICIES

Attendance: Students are expected to attend every scheduled class meeting and to be on-time. It is the responsibility of the student to obtain any material missed during an absence from his/her classmates. Power Points are not placed in the library and placement on Blackboard will be limited.

Late work: Students will be given a Late Assignment Penalty for tardy work: 10% assignment grade deduction per class day late. However, after the 3rd day, late assignments will not be accepted. In-class late assignments are defined by being turned in after 8:15 am. Please note that class assignments may be sent to me by e-mail or slid under my office door; tardiness is determined by the time noted on the instructor’s Inbox, but allowances can be made for server problems. Files contaminated by viruses, spyware, and worms will not be accepted. DO NOT ASK THE CUSTODIANS to let you into my office to place an assignment on my desk.

Missed exams and quizzes: Students have two choices for making up exams due to excused absences. They can do an all-essay make-up exam, or doubling the grade on the final exam. There is no make-up for missed quizzes, nor for missed exams due to unexcused absences. Missed extra credit opportunities may or may not be given make-up assignments, depending upon the nature of the assignment. Please note that instructor determines what is not excused. I define excused absences as emergency visits to the ER or physician or dentist; job, graduate and professional school interviews; death of close family members (siblings, in-laws, parents, aunts or uncles, step-parents, grandparents or great-grandparents, first cousins), or University-approved absences as described in the Catalogue and Student Handbook.
Citation format: Please use Council of Science Editors format, NOT APA or MLA. If you don’t know this, ask someone in Pro Skills!

Professional Courtesy: DO NOT USE CAMERA PHONES IN LECTURE OR LAB. DO NOT SEND TEXT MESSAGES DURING CLASS. Please turn off all cell phones, beepers, Bluetooth devices, iPhones, Palm Pilots, Black Berrys, etc., before entering the classroom, or at least place them on silent or airplane mode. I would prefer that earpieces not be worn in lecture. Recording of lectures with tape recorders can only be done with permission of instructor. Please refrain from eating in class; if you must eat for medical reasons, please see me privately.

List-serve: All students must subscribe to Opportunities List Serve. To subscribe, send a separate e-mail 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.

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. I will be placing more information on Blackboard 9.1, including either the papers assigned, or a link.

At the end of the course, if you want to unsubscribe, 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!

GRADED ACTIVITIES—Evaluation
Introduction—Please note that Instructor may modify assignments, number of assignments and point values depending on number of students in class. Also note that “any mid-term grades posted on S.A.I.L. and Blackboard are not official University grades, not a guarantee of final grades and are never updated; once they are posted they cannot be changed even if your grade in the class does change.”

Class Grading Scale
Evaluation:
1. Two exams (Mid-Term and Final, each worth 100 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, or a combination of both. The final exam may or may not be cumulative. Class exams normally take 75-90 minutes in length.

If a take-home exam is given, it will have a finite time limit outside of class. You are free to use any sources for the take-home exam, including any materials online, 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.

Please note that your final exam may be written, oral, a presentation, or any combination; it may be spread over several days (August 5-7).

2. Paper Discussion (total 25 or 50 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 2-4 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 reserve the right to give quizzes to the class. **All students will do one presentation, but instructor reserves right to change to two, depending on class size.** 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 non-legitimate excuses (as determined by professor), I may deduct 12.5 points for each discussion, and ask you to try again. Students can be asked to lead more than two discussions. If BIOL 4304 and BIOL 5304 have cumulatively >25 students, instructor reserves the right to give one paper discussion at 50 pts.

3. Quizzes (50 pts total): I will give 1-6 quizzes, ranging from 5 to 25 points total. It is unlikely that make-ups will be given for quizzes. Instructor reserves the right to use any diagnostic assessments (pre and post-tests) as quiz grades.

N.B: Instructor may increase number of paper discussions, and concurrently decrease number of quizzes. While total number of points for both should equal 100, it can be greater for either category to allow for extra credit opportunities!

4a. Grant Proposal (150 pts): Graduate students will turn in a mini-grant proposal in NIH or NSF format (former preferred), worth 150 pts. The proposal will consist of the following sections: Specific Aims/Project Description, Background/Significance, Experimental Design, Timetable, Bibliography. This proposal should consist of 7-10 pages, excluding cover page) on a virus of your choice—I may allow grad students to do a virus we cover in class or in case studies, but on a different research focus. This paper will include formulation of at least two separate Specific Aims that are hypothesis-driven, with the experimental design logically following from the Specific Aims. The bibliography must contain at least 10 sources, of which seven must be primary literature and a maximum of one review and one Internet source.

---The **final date** for deciding which virus will be the subject of your proposal is R July 10, but you are free to decide earlier.

---The grant proposal is due R July 17, and worth 150 pts. **I WILL NOT ACCEPT LATE GRANT PROPOSALS FROM GRAD STUDENTS**—if you think you might be late, turn it in early! Please note the Graduate Proposal is due the same day that the Mid-Term exam will be taken.
5. Power-Point Presentation (150 pts): I expect each grad student to give a 20-30 minute Power-point ™ talk involving some aspect of their grant proposal to the class. You must include the general aspects of the virus studied (viral type, replication, host, diseases caused, unique features of virus); you may want to discuss why your proposal is worth studying, and what you hope to accomplish. This presentation will be done July 29-30, but if there are many undergraduate projects, I may ask you to do this on the day of the final exam.

Grade Calculations
Mid-term =100 pts
Final exam =100 pts
Minimum of 1-2 paper discussion = 50 pts.
Grant proposal = 150 pts
1-6 quizzes = 50 pts
Power point presentation = 150 pts

Maximum 600 pts

Grading Scale (out of total points)—Will NOT be adjusted
A≥90%  B=80-89.9%  C=70-79.9%  D=60-69%  F<60%

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.

6. Extra Credit assignments may be given at prerogative of instructor, either as case histories, Internet assignments, seminars, guest lectures, or journal articles to read/summarize.

7. Missed exams—Excused only per TAMUCC guidelines; such exams are given only under EXTREME circumstances, and will be total essay.

Tentative Lecture Schedule       BIOL 5304.001  Summer II 2014
OCNR 145

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! Chapters from Acheson (2007) are in standard font; chapters from Acheson 2012 are in bold font. You are also welcome to read corresponding chapters in Strauss and Strauss (2008; in parentheses) or in Cann (2012). Please note that for any given day, papers being read for Paper Discussion may not correspond to viruses being studied in lecture part.

<table>
<thead>
<tr>
<th>class</th>
<th>Date</th>
<th>Topic</th>
<th>chapters</th>
<th>Paper(s) discussed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M Jul 7</td>
<td>Introduction to Virology; History, Structure, Replication</td>
<td>1, 2, 3, 1, 2, 3 (1, 2)</td>
<td>No paper</td>
<td>Students form groups for project</td>
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<td></td>
<td></td>
<td>viral studies</td>
<td>see ancillary texts</td>
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<td>3</td>
<td>W</td>
<td>Jul 9</td>
<td>Viral Pathogenesis &amp; Immunology</td>
<td>Lin et al. 2014. mBio 5(2): e01047-14</td>
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<tr>
<td>4</td>
<td>R</td>
<td>Jul 10</td>
<td>(+) RNA viruses: ss: Picornaviruses, Flaviviruses, Coronavirus, Togaviruses; ds: Reoviruses</td>
<td>Graduate virus proposal topic due</td>
<td></td>
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<tr>
<td>6</td>
<td>T</td>
<td>Jul 15</td>
<td>(-) stranded RNA Filoviridae, Rhabdoviridae</td>
<td>Pre-proposal due for Undergrads</td>
<td></td>
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<tr>
<td>8</td>
<td>R</td>
<td>Jul 17</td>
<td>Mid term Exam</td>
<td>Graduate Proposal due</td>
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<tr>
<td>12</td>
<td>R</td>
<td>Jul 24</td>
<td>DNA Viruses III: Papilloma viruses, polyomaviruses &amp; pox viruses</td>
<td>Last day to drop is F Jul 25</td>
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<td>14</td>
<td>T</td>
<td>Jul 29</td>
<td>Power Point presentations</td>
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<td>class</td>
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<td>W Jul 30</td>
<td>Poster presentations</td>
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<td>16</td>
<td>R Jul 31</td>
<td>Poster presentations</td>
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<td>TBA</td>
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<tr>
<td>17</td>
<td>M Aug 4</td>
<td>Poster presentations</td>
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<td>TBA</td>
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<td>18</td>
<td>T Aug 5</td>
<td>Poster presentations (if necessary; final Exam Part I)</td>
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<td>TBA</td>
<td>Last day to withdraw from university</td>
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<td>19</td>
<td>W Aug 6</td>
<td>Final Exam Part I continued</td>
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<tr>
<td>20</td>
<td>R Aug 7</td>
<td>Poster presentations (if necessary); Final Exam Part II</td>
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**Viruses not covered in class (use for Pre-Proposal and Poster):**

- Caliciviridae (Norwalk: Noroviruses)
- Iridoviridae (lymphocystis Virus)
- Papillomavirus (Cottontail Rabbit Virus)
- Caulimoviridae (Cauliflower mosaic virus)
- Poxviridae (Molluscipoxvirus: Molluscum contagiosum virus)
- Picornavirus (Black Cell Queen Virus; Parechovirus)
- Circovirus (Chicken Anemia)
- Cricket paralysis virus
- Tombusvirus
- Tauro shrimp virus
- Reovirus (Orbivirus: Blue tongue virus)
- Aphthovirus
- Cutthroat trout virus

- Deltaretrovirus (Bovine leukemia virus)
- Sputnik virus or Mimivirus
- Rhabdoviridae (Ephemerovirus)
- Arteriviridae (Equine arteritis)
- ssRNA Satellite viruses (Tobacco necrosis satellite virus)
- Coltivirus (Colorado Tick Fever virus)
- Walleye Dermal Sarcoma virus
- Visna-maedi (ovine) Virus
- Peste des petits ruminants virus
- Turkey Astrovirus
- Yellow Head Virus
- Cutthroat trout virus
- Nodaviruses (Flock House Virus)
Required Papers by title

Please be prepared to go to library databases and download the papers for your own use. I may be able to place SOME of the pdfs or the URL (through Bell Library databases) for articles to which the university has a site license. NOTE: Because of copyright laws governing use of journal articles on course management systems, access may be restricted to conform according to Title 17 United States Code (Copyright Laws).


Supplementary papers (may or may not be placed on Blackboard)—Not mandatory to read

Please note these papers are/were hot in terms of citations, impact factors, and interest

Bodily JM, Mehta KPM, and Laimonis LA. 2011. HPV E7 enhances hypoxia-inducible factor 1-mediated transcription by inhibiting binding of histone deacylases. Cancer Res 71: 1187-1195


Kraemer JA et al. 2012. A phage tubulin assembles dynamic filaments by a novel mechanism to center viral DNA within the host cell. Cell 149(7): 1488-99 [Not on Blackboard; students have access through Bell Library databases]

Rutala WA and Weber DJ. 2010. Guidelines for disinfection and sterilization of prion-contaminated medical instruments. Infection Control and Hospital Epidemiology 31(2) : 107-117

Virology 5304 Rubric for Powerpoint Presentations Summer II 2014 Instructor edition

Name of presenter ___________________________   Start time______ End time ______

Directions: Score as follows:
0= Missing     1= Poor    1.5= Suboptimal   2=Fair   3= Good    4=Very Good
5=Excellent

Format
1. Student has 20-25 legible slides with consistent format, background, and color scheme _____
2. Narrative slides do not have too many words/facts on a single slide ______
3. Narrative slides contain tables, figures, and graphs that help to tell the story____
4. Graphs/tables are clear, concise and accurate with correctly-labeled axes, labels____
5. Order of presentation tells a clear, logical story of the information presented. ______

Content
1. Student had sufficient knowledge about area of presentation. _______
2. Student understood area well enough to explain content. ______
3. Student presented scientific content in a coherent fashion. ______
4. Student cited/acknowledged work done by others. _______
5. Student topic derived from original idea that was expanded. ______

Oral Presentation of Power Point Presentation
1. Presenter spoke in 20-30 minutes (subtract 1 pt for each min above /below). _____
2. Presenter gave presentation in IMRAD form____
3. Presenter clearly articulated major points of the work.____
4. Presenter gave a talk that was concise in describing work presented. ____
5. Presenter gave a talk that was relatively free of grammatical errors. _____
6. Presenter adequately handled questions at the end of the presentation. _____
7. Presenter spoke without many pauses, giggles, “uhhs,” “you knows,” and “likes.” _____
8. Presenter exhibited professionalism in making presentation. _____
9. Presenter gestured to words/graphics.____
10. Presenter talked to audience, not to wall, slides, or inanimate objects. _____

Final score given by instructor ______
Average number of points from peers______
Average of two scores __________________
(Score avg/100 x 1.5)= ______________ Final Grade
Grant Proposal Rubric–Grad Students   BIOL 5304 SU II 14   Dr. Buck

Name of student   _______________________

Criteria for draft: 0= Missing   0.5=Suboptimal   1.0=Poor     2.0=Weak    2.5=Average
3= Good     4=Very Good    4.5=Excellent      5= Flawless

Format of Proposal (30 points—You may use NSF or NIH Format)
1. Student used past tense, correct grammar and spelling with smooth transitions. _____
2. Student has 7-10 pages, excluding cover page and bibliography. _____
3. Proposal in format with (a) Project Summary or Description/Abstract (b) Bkgd (c) Objectives (d) Specific Aims or Design & Expected Outcomes (e) Timetable/Budget (f) References. _____
4. Appropriate formatting (double-spacing, numbered pages, indented paragraphs) ______
5. Abstract follows appropriate style, and limited to 250 words ______
6. Overall proposal is in either NIH (preferred) or NSF format. _____
Format subtotal  _____

Content (70 pts)
1. Background/Introduction …
a. contains information about what is/is not known. ____
b. justifies why the unknown information will advance science. _____
c. describes the long-term goals, the problem or hypothesis. ______
d. Proposal can be done by researcher. ______

2. The Objectives section…
a. contains 2-3 Specific Aims that will answer questions posed in hypothesis. ______
b. contains Specific Aims that are non-sequential. ______
c. contains plausible results with each Specific Aim. ______
d. accurately describes how the results confirm the hypothesis. ______
e. describes alternative experiments that will answer the hypothesis. ______
3. A timetable is included. ______
4. A budget is included. ______
5. Literature is cited clearly throughout paper, using (name, date), or reference numbers follow those in References. ______
6. The style is consistent throughout the references. ______
7. Ten references are seen, with seven references being from primary literature; no more than one review is cited; style of references is consistent; critical references are included ______

Final score given by instructor ______
(Score avg/100 x 1.5)= ______________ Final Grade

Comments:
The Grant Pre-Proposal Format--Virology 5304.001 SU-I 2012 to SU II 2014

Grant proposals are written in the following format:

Abstract
250 words maximum; if you can’t write an abstract, please see me privately

Background
500 words maximum
What is known about the area!
What is not known about your area of interest?
Why is the unknown information important to know?
   How will obtaining this information advance science?
   What exactly are you hypothesizing?

Objectives
100-250 words
Include two Specific Aims
   Specific aims describe how you plan to find the knowledge in which you are interested
Step-by-step of what you wish to do experimentally
   How do you want to answer your hypothesis piece-by-piece?
   What part of the hypothesis will you answer with each Specific Aim?
   In each Specific Aim, you will have at least two (2) sub-aims that you will answer.

Experimental Design/Outcomes
Under each Specific Aim, what experiments will you do to determine if your hypothesis is correct?
   **Your Specific Aims cannot be consecutive, sequential or dependent:** i.e., you have to be able to answer Specific Aim #2 without having the knowledge in Specific Aim #1
Outcomes: What results do you anticipate from your experimental work?
   How will these experiments confirm your hypothesis?
   What alternative experiments do you have in mind that will give you the information and answer your hypotheses if your original experiment(s) do(es) not work?

References (five to ten)
At least seven references must be primary literature and a maximum of 1 review and 1 Internet source. A paper from a journal published on-line is NOT an internet source, which includes ICTV, or All the Viruses on the Web.

References must be cited within the paper
You must include certain critical papers! There are certain critical key papers you must know and cite!
The Grant Proposal Format-- **Virology 4304.001 SU-I 2012--SU II 2014**

A student who took the graduate class in spring 2003, Ms. Nancy L. Gonzales, designed a fill-in rubric to assist in describing how you might wish to do the proposal. This rubric is presented here, with thanks to Nancy, who now teaches at Texas State Technical College in Harlingen!

**Background—What is known about your area of interest?**

________________________________________________________________________
________________________________________________________________________

**What is not known about the area of interest?**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Why is unknown information important to know?**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**How will obtaining this information advance science?**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**What exactly are you hypothesizing?**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**What two aims will you do to test aspects of your hypothesis?** *Aims should not be sequential or dependent; in short, you should be able to do Aim 2 without having to do Aim 1. If aims are dependent, your grant is usually thrown out in the real world.*

________________________________________________________________________
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________________________________________________________________________