BIOL 4304.001  BIOLOGY of VIRUSES     Summer I 2012 v8
TEXAS A&M UNIVERSITY—CORPUS CHRISTI
COLLEGE OF SCIENCE & ENGINEERING

Instructor: Gregory W. Buck, Ph.D.
Office Phone: 361.825.3717   E-mail: Gregory.Buck@tamucc.edu
Office: Center for the Sciences 251   Office Hours: MW 10:00-11:15 a.m.; TR 1:00-2:15 p.m. or by appointment.
Lecture: MTWR 8:00 am-9:55 am, ST104
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 and human 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 all medical aspects of virology and taxonomy described in professional school (MD, DO, DVM, DDS), nor viral treatment modalities.

Student Learning Outcomes:
Upon completion of this course, students will be able to perform these objectives at an accuracy level of 70% or greater:
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.

Recommended Textbooks: I would strongly suggest that students buy either the first or the second text listed here, as they might be helpful. However, you are NOT required to purchase any of these:
My secondary source for this course, but more specific than Strauss. The first edition (2006) is actually a bit dated, but still a good reference, and I have listed it in the helpful references section below.
You can also buy the e-book (ISBN 978-1-1182-1489-3) for $92; go to this site if interested: www.coursesmart.com

Good readable book, but specific for HIV, which is only a part of the course

Helpful References
20. http://www.virology.net/garryfavweb.html; Dr. David Sander’s “All the Virology on the Web” site; fairly accurate; accessed 03/28/12.

**Supplies/materials required (at student cost):** Textbook(s), 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.

**Audience Defined:** Senior Biology and BIMS students with knowledge of Microbiology, Genetics, Cell Biology, Molecular Biology, Immunology, Physiology, and Biochemistry, and the ability to integrate knowledge from these fields in learning the nature and classification of viruses. This course may be helpful for those majors planning to attend graduate (MS, PhD) and professional schools (MD, DO, PharmD, PA, OD, DDS), and for future clinical laboratory science (CLS) professionals.

**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 the Texas A&M University-Corpus Christi University Rules and Procedures (Section B [Academic Program], Part 13 [Students]: 13.02.99.C2
[Student Grade Appeals] and 13.02.99C2.01 [Student Grade Appeal Procedures]), any 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 on 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, consult the University Rules and Procedures specified above (accessible through the University Rules and Procedures website at http://www.tamucc.edu/provost/university_rules/index.html). For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

**Academic Advising:** The College of Science and Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. The College's Academic Advising Center is located in CI Suite 350, and can be reached at (361) 825-6094.

**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.
**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 June 22
Deadline to withdraw from University for the summer session: T July 3

**Academic Integrity:** TAMUCC academic policies are in force, including standards for academic integrity & honesty, plagiarism, grammar and spelling. All policies are described in the TAMUCC catalogue and the Code of Conduct in the Student Handbook. We also have to report all instances of cheating to the Dean of Students office on an Academic Misconduct form.

**Citation format:** Please use Council of Science Editors format, NOT APA or MLA. If you don’t know this, ask someone in Pro Skills!

**ProfessionalCourtesy:** 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 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!
I will be placing more information on Blackboard 9.1, including the papers assigned.

Note: 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 islander.tamucc.edu account!! I will also try to send it within Blackboard 9.1.

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!

GRADED ACTIVITIES—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 part of your final exam may be oral in nature! Instructor reserves right to split final exam over two class periods (Jul 5 and Jul 6).

2. Paper Discussion (25 pts each; total 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 (extra credit). All students will do two 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 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 do more than two discussions. Caveat: If class size is >25, instructor reserves the right to limit students to one paper discussion worth 50 pts.

3. Quizzes (50 pts total): I will give 1-5 quizzes, ranging from 5 to 25 points total. Due to the shortened summer session, it is unlikely that make-ups will be given for quizzes. I reserve the right to use any diagnostic assessments as quiz grades.
4. Group Pre-proposal (100 pts) and Poster Project (100 pts): I am requesting that students work in groups of three to four (3-4) students to undertake a project on a virus not covered in class.

Pre-proposals should focus on molecular biology of virus, or the relation of virus to the immune system (e.g., cytokines), NOT on identification, pathogenesis, treatment, or epidemiology!

4a. Pre-proposal (100 pts): 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 (maximum) “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 two 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. PLEASE NOTE THIS ASSIGNMENT IS DUE ONE WEEK AFTER CLASS STARTS!!!

4b. Poster (100 pts): 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 15 to 20 min group presentation of their project. Instructor reserves the right to put information from posters on exams. Late poster presentations are not accepted.

While the pre-proposal and poster are designed to be done as a group of three to four persons, if all group members are not contributing equally, I will penalize or give differential grades.

Grade calculations
Mid-Term Exam =100 pts
Minimum of 1-2 paper discussions =  50 pts.
Quizzes (1-5) =  50 pts.
Pre-proposal = 100 pts
Poster presentation =100 pts
Final exam =100 pts.
Maximum 500 pts

Final Exam: F July 6--8 am-9:55 am
Grading scale: A≥90% B=80-89.9% C=70-79.9% D=60-69% F<60%

Pre-Proposal due M Jun 11; Exam 1 (Midterm) R Jun 14 Final Exam F July 6

Tentative Lecture Schedule BIOL 4304.001 Summer I 2012
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! All chapters are from Acheson (2007)—as of the writing of the syllabus in March 2012 to comply with Texas HB 2504, instructor did not have the newer text. You are also welcome to read corresponding chapters in Strauss and Strauss (2008; in parentheses)

<table>
<thead>
<tr>
<th>Wk</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 Jun 4</td>
<td>Introduction to Virology; History, Structure, Replication</td>
<td>1, 2, 3 (1, 2)</td>
<td>No paper</td>
<td>Students form groups for project</td>
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<tr>
<td>2</td>
<td>T Jun 5</td>
<td>Molecular Biology tools for viral studies</td>
<td>Not in text</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>W Jun 6</td>
<td>Viral Pathogenesis &amp; Immunology</td>
<td>4, 31 (10)</td>
<td>TBA</td>
<td>Virus chosen for Pre-proposal and poster</td>
</tr>
<tr>
<td>4</td>
<td>R Jun 7</td>
<td>(+) RNA viruses: ss: Picornaviruses, Flaviviruses, Coronaviruses, Togaviruses; ds: Reoviruses</td>
<td>16, 17, 18, 19, 24 (3)</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>M Jun 11</td>
<td>(-) stranded RNA viruses: Paramyxoviruses, Orthomyxoviruses</td>
<td>20, 23 (4)</td>
<td>TBA</td>
<td>Pre-proposal due</td>
</tr>
<tr>
<td>6</td>
<td>T Jun 12</td>
<td>(-) stranded RNA Filoviridae, Rhabdoviridae</td>
<td>21, 23 (4)</td>
<td>TBA</td>
<td></td>
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<tr>
<td>7</td>
<td>W Jun 13</td>
<td>Hepadnaviridae</td>
<td>28 (6)</td>
<td>TBA</td>
<td></td>
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<tr>
<td>8</td>
<td>R Jun 14</td>
<td>Mid term Exam</td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td>M Jun 15</td>
<td>DNA Viruses I: Herpesviridae</td>
<td>13 (7)</td>
<td>TBA</td>
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<tr>
<td>10</td>
<td>T</td>
<td>Jun</td>
<td>19</td>
<td>Retroviridae</td>
<td>25, 26 (6) ; Stine Ch 3</td>
</tr>
<tr>
<td>11</td>
<td>W</td>
<td>Jun</td>
<td>20</td>
<td>DNA Viruses II: Adeno, Parvo,</td>
<td>9, 12 (7)</td>
</tr>
<tr>
<td>12</td>
<td>R</td>
<td>Jun</td>
<td>21</td>
<td>DNA Viruses III: Papilloma viruses, polyomaviruses &amp; pox viruses</td>
<td>11, (7)</td>
</tr>
<tr>
<td>13</td>
<td>M</td>
<td>Jun</td>
<td>25</td>
<td>Power-Point presentations (Grad Students)</td>
<td></td>
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<tr>
<td>14</td>
<td>T</td>
<td>Jun</td>
<td>26</td>
<td>Power Point presentations (Grad Students); May start UG Posters</td>
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<tr>
<td>15</td>
<td>W</td>
<td>Jun</td>
<td>27</td>
<td>Poster presentations</td>
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<tr>
<td>16</td>
<td>R</td>
<td>Jun</td>
<td>28</td>
<td>Poster presentations</td>
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<tr>
<td>16</td>
<td>M</td>
<td>Jul</td>
<td>2</td>
<td>Poster presentations</td>
<td></td>
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<tr>
<td>17</td>
<td>T</td>
<td>Jul</td>
<td>3</td>
<td>Poster presentations (if necessary)</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>W</td>
<td>Jul</td>
<td>4</td>
<td>US Independence Day--no class</td>
<td></td>
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<tr>
<td>19</td>
<td>R</td>
<td>Jul</td>
<td>5</td>
<td>Poster presentations (if necessary); Possible half of final exam</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>F</td>
<td>Jul</td>
<td>6</td>
<td>Final Exam</td>
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</tbody>
</table>
Viruses not covered in class (use for Pre-Proposal and Poster):
Caliciviridae (Norwalk: Noroviruses)  Deltaretrovirus (Bovine leukemia virus)
Iridoviridae (lymphocystis Virus)  Sputnik virus or Mimivirus
Papillomavirus (Cottontail Rabbit Virus)  Rhabdoviridae (Ephemerovirus)
Caulimoviridae (Cauliflower mosaic virus)  Arteriviridae (Equine arteritis)
Poxviridae (Molluscipoxvirus: Molluscum contagiosum virus)  ssRNA Satellite viruses (Tobacco necrosis satellite virus)
Picornavirus (Black Cell Queen Virus; Parechovirus)  Coltivirus (Colorado Tick Fever virus)
Circovirus (Chicken Anemia)  Walleye Dermal Sarcoma virus
Cricket paralysis virus  Visna-maedi (ovine) Virus
Tombusvirus  Peste des petits ruminants virus
Tauro shrimp virus  Turkey Astrovirus
Reovirus (Orbivirus: Blue tongue virus)  Yellow Head Virus
Aphthovirus  Cutthroat trout virus

Papers by title – to be determined
Pre-Proposal Rubric   BIOL 4304   SP 2011   Dr. Buck   version 7

Group members__________________________  For 100 point scale

Scoring Criteria: 0= Missing  0.5=Minimum  1.0 =Poor  1.5= suboptimal  2.0=Average
3.0= Good  3.5=Very good  4.0=Excellent

Format of Paper
1. Pre-proposal used appropriate tense (e.g., future). _____
2. Pre-proposal has 3-5 pages, excluding cover page and bibliography. _____
3. Pre-proposal used correct grammar and spelling _____
4. Pre-proposal contained Abstract, Background, Objectives, Exptl. Design, References. _____
5. Appropriate formatting seen (single-spacing, font size 11 or 12 Ariel or Times New Roman, numbered pages, separate paragraphs, some white space); range 10-14 size font_____  
6. Abstract contains ≤250 words and follows appropriate style (no citations)._______
7. Flow of paper is smooth between text, figures, and tables. _______  
8. The style is consistent throughout the bibliography. ______

9. Background (~ 1 page)  
a. describes what is known and what is not known in area. _______  
b. describes rationale for finding unknown information _______  
c. Contains a clear hypothesis or problem statement _______  
d. Clearly states how field will be advanced_______

10. Objectives (~ 0.5 page)  
a. States a clear reason why study is being undertaken_______  
b. Clearly delineates two non-dependent Specific Aims_______  
c. Aims contain succinct statement as to what work will be done to answer hypothesis ______

11. Experimental design… (~2-2.5 pages)  
a. Includes methods that will answer questions posed in hypothesis.______  
b. Gives plausible results.______  
c. Mentions alternative procedures that can also answer question. _____

d. Provides data in narrative, graph, or tabular form. _____  
e. Contains links between the hypothesis and data._______

12. References  
a. Five to ten references are seen______  
b. At least six references come from primary literature, & not reviews. _______  
c. References cited throughout paper, using CSE/CBE format, not APA or MLA_______  
d. Internet sources can be corroborated_______

13. Collaboration Among Group Members  
a. Members contributed equally to project; if not, differential grades are given below.__________  
b. Members could iron out creative and scientific differences. _______

Final Score out of 100 pts. ___________  If dissention, different grades for ________________.

Comments:_____________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
Professor Rubric for Grading Undergraduate Poster Presentations BIOL 4304 Virology  Dr. Buck  SU12

Name of presenters ______________________________________________________
_______________________________________________________________________

Title/Subject of Poster____________________________________________________

Directions: Score as follows:
0= Missing  1= Poor  2= Fair  3= Good  4=Very Good  4.5=Excellent  5=Perfect

Format
1. Poster contains legible font, with appropriate sizes for title, authors, headings and text _____
2. Poster contains all student presenters as co-authors, and contained the top three authors of the most seminal papers used for the project_____  
3. Poster is professional, neat, clear (color scheme, background, title, graphs, photos, white space)_____ 
4. Layout allows each section to be read in logical sequence (IMRAD) without explanation____

Scientific Content & Understanding
5. Problem or hypothesis is described on poster or by presenter ______
6. Background information increases your knowledge of the subject________
7. Information on the virus described is accurate, to the extent of current knowledge_____
8. Presenters understood methods and techniques used to answer hypothesis________
9. Presenters show proper experimental design (controls, variables, replicates)_____
10. Presenters were able to extend previous work to the next step_____
11. Work shows that presenters understand the significance (the “so-what?” factor) of the research____

Presentation
12. Presenters spoke in 15-20 minutes (-1 pt for each minute above/ below range)_____
13. Presenters gave presentation in IMRAD form_____
14. Presenters clearly articulated major points, & concisely described work ____
15. Presenters gave a talk that was relatively free of grammatical errors _____
16. Presenters adequately handled questions at the end of the presentation _____
17. Presenters spoke without many pauses, “uh, ” “you knows, ” and “likes” _____
18. Presenters exhibited professionalism in making presentation; appropriate for senior students to make at local or national meeting _____
19. Presenters talked to audience, not to wall or poster, nor relied extensively on note cards _____
20. All group members appeared to contribute to presentation _______

Members not contributing: ______________________________________________

Mean of peer scores________
Professor score___________
Final score_______________

Comments (peer and professor)
______________________________________________________________________________________________
______________________________________________________________________________________________
______________________________________________________________________________________________