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<td>December 6</td>
<td>FINAL EXAM (200 points), TUESDAY, 8:00-10:30a.m.</td>
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Chapter Reading in *Textbook of Diagnostic Microbiology, Fourth Edition*, by CR Mahon, DC Lehman, G Manuselis (2011)

Additional Case Study reading available in *Medical Microbiology, Sixth Edition* by P. R. Murray et al. (2009) on Limited Loan in Kennedy Memorial Library

Class materials available at:  http://instructional1.calstatela.edu/mlee28
Websites of Interest:
- American Society of Virology (ASV): http://www.asv.org/
- American Society of Microbiology (ASM): http://www.asm.org/
- Centers for Disease Control and Prevention (CDC): http://www.cdc.gov/
- World Health Organization (WHO): http://www.who.int/

Course Prerequisite: The completion of MICR 300 (General Microbiology) with a grade of C or better.

Course Objectives: Upon completion of the course, the student will have a basic understanding of the following topics:
1) Normal microbial flora
2) Collection and cultivation of clinical specimens
3) Selection, use and content of microbiological culture media
4) Host-parasite relationships, microbial pathogenesis and host defense mechanisms
5) Viruses, bacteria, fungi and parasites involved in causing human disease
6) Antimicrobial therapy
7) Creative critical thinking skills

Attendance: Lecture attendance is highly recommended with the understanding that students are responsible for all information presented. Laboratory attendance is mandatory and a requirement for the Course. Case Study Reports will be turned in at lecture.

Grading: Course grades will be determined by percentage according to the following guidelines:
90-100% = A; 80-89% = B, 70-79% = C, 60-69% = D, <59% = F.

The lab and the lecture will each count for 50% of the Course Final Grade with points distributed as:

Lecture:
- Midterm Exam - 100 Points
- Case Study Reports - 100 Points
- Final Exam - 200 Points
- Lecture Total = 400 Points (50% of Course Grade)

Lab:
- Midterm Exam - 100 Points
- Flow charts - 30 Points
- Lab write-up - 50 Points
- Lab pop quizzes - 70 Points
- Final Exam - 150 Points
- Lab Total = 400 Points (50% of Course Grade)

Academic Honesty: Cheating (deceit, trickery, artifice) and plagiarism (steal and pass off the ideals or words of another as one’s own) are in violation of the spirit of learning at the University. A student in violation of this policy in any assignment related to this course will be subject to the options specified in the CSULA policy statement.
The Getzels / Helmholtz / Poincare Steps To Creative Problem Solving

1. **First Insight:**
   Ask a question.
   Entry level questions. I wonder why? I wonder if?
   Inquiry methods used to initiate insight and understanding of concepts.

2. **Saturation:**
   Research and inquiry into existing information.
   One is focused on research methods and finds everything that they can that is relevant.
   At this time one may find things they do not expect.

3. **Incubation:**
   This stage can vary in terms of time and the quality of the research and questions asked in the prior stage.
   Requires wait time and redundant activities.
   Good time to take a shower, and do dishes!

4. **“Ah-Ha” moment of creativity:**
   The moment of insight.
   The quality of the insight depends on the quality of the questions, the nature of the research, etc.
   A state that is fragile, all at once, Eureka! I have found it!
   Joy/relief are experienced.

5. **Verification:**
   The stage of putting the solution into concrete form while checking it for error and usefulness.
   Where one’s investment in the process pays off. Scrutiny and testing are used to prove something.
   A must in the scientific community.

Thus we have an approximate structure of five stages in the creative process.

**Background information on this creativity model:**

Successful steps in the creative process, were not categorized until late in the nineteenth century, when the German physiologist and physicist Herman Helmholtz described his own scientific discoveries in terms of three specific stages. He named the first stage of research *saturation*; the second, mulling-over stage *incubation*; and the third stage, the sudden solution, *illumination*. French mathematician Henri Poincare added a fourth stage, *verification*.

In the early 1960’s, the American psychologist Jacob Getzels contributed the important ideal of a stage that precedes Helmholtz’s saturation: a preliminary stage of problem finding or formulating. Getzels pointed out that creativity is not just solving problems of the kind that already exist or that continually arise in human life. Creative individuals often actively search out and discover problems to solve that no one else has perceived. Another American psychologist, George Kneller, named Getzels’ preliminary stage *first insight* – a term that encompassed both problem solving (of existing problems) and problem finding (asking new and searching questions).


“The formulation of a problem is often more essential that its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old questions from a new angle, requires creative imagination and marks real advances in science.”

A Taxonomy of Critical Thinking Skills

“Many people would sooner die than think. In fact they do.”
Bertrand Russell (quoted in Macmillan Publishers, 1989)

1. Verbal Reasoning Skills
The skills listed under this rubric include those that are needed to comprehend and defend against the persuasive techniques that are embedded in everyday language (also known as natural language). Thinking and language are closely constructs, and the skills included in this section recognize the reciprocal relationship between language and thought in which an individual’s thoughts determine the language used to express them, and the language that is used shapes the thoughts.

2. Argument Analysis Skills
An argument is a set of statements with at least one conclusion and one reason that supports the conclusion. In real life settings, arguments are complex with reasons that run counter to the conclusion, stated and unstated assumptions, irrelevant information, and intermediate steps. Arguments are found in commercials, political speeches, textbooks, and anywhere else where reasons are presented in an attempt to get the reader or listener to believe that the conclusion is true. The skills of identifying conclusions, rating the quality of reasons, and determining the overall strength of an argument should be sharpened in college course work.

3. Skills in Thinking as Hypothesis Testing
The rationale for this category is that much of our day-to-day thinking is like the scientific method of hypothesis testing. In many of our everyday interactions, people function like intuitive scientists in order to explain, predict, and control the events in their life. The skills used in thinking as hypothesis testing are the same ones that are used in scientific reasoning – the accumulation of observations, formulation of beliefs or hypotheses, and then using the information collected to decide if it confirms or disconfirms the hypotheses.

4. Using Likelihood and Uncertainty
Because very few events in life can be known with certainty, the correct use of probability and likelihood plays a critical role in almost every decision. Huff’s (1954) tiny, popular book How to Lie With Statistics is still widely quoted because it explains how easy it is to mislead someone who does not understand basic concepts in probability. The critical thinking skills that are subsumed under this heading are an important dimension of a college-level critical thinking taxonomy.

5. Decision Making and Problem Solving Skills
In some sense, all of the critical thinking skills are used to make decisions and solve problems, but the ones that are included here involve the generation and selection of alternatives and judging among them. Many of these skills are especially useful in quantitative reasoning problems.

Taken together these five categories define an organizational rubric for a skills approach in critical thinking. They have face validity and can be easily communicated to the general public and students and offer one possible answer to the question of what college students need to know and be able to do to compete and cooperate in the world’s marketplace and function as effective citizens in a democratic society.

LABORATORY SCHEDULE

September 22  Effectiveness of Handscrubbing
September 27  Microscopes / Differential Staining / General Purpose Media
September 29  Microscopes / Special Staining / Differential and Selective Media
October 4    Skin normal flora - primary isolation
October 6    Skin normal flora – biochemicals
October 11   Skin normal flora - read biochemicals
             Naso/oropharynx normal flora - primary isolation
October 13   Naso/oropharynx normal flora – biochemicals
             **Flow chart for Skin normal flora due (10 points)**
October 18   Naso/oropharynx normal flora - read biochemicals
             GI tract normal flora - primary isolation
October 20   GI tract normal flora – biochemicals
             **Flow chart for Naso/oropharynx normal flora due (10 points)**
October 25   GI tract normal flora - read biochemicals
October 27   Sensitivity testing (Kirby Bauer and MIC)
             **Flow chart for GI tract normal flora due (10 points)**
November 1   **MIDTERM EXAM (100 points)**
November 3   Immunology – Precipitation (Ouchterlony); Agglutination (Mononucleosis Test, ABO & Rh typing)
             Sensitivity testing (MBC)
November 8   Read Ouchterlony plates; Micropipettor practice; Immunology/Virology – AIDS ELISA
             **Lab Report for Precipitation due (10 points)**
November 10  Immunology/Virology - begin AIDS Western Blot
             **Lab Report for Agglutination due (10 points)**
November 15  Immunology/Virology – finish AIDS Western Blot
             Transformation; Mycology isolation
             **Lab Report for ELISA due (15 points)**
November 17  Phage titer; *Candida* identification (Germ tube cryovial; CHROMagar Candida)
             **Lab Report for Western Blot due (15 points)**
November 22  Mycomounts of Mycology isolation
November 24  *Thanksgiving Day Holiday*
November 29  Parasitology (Protozoans, Helminths)
December 1   **FINAL EXAM (150 points)**

*Each student will need a bound notebook to write and record data and results for each lab exercise. However, only the Lab Report on the Immunology exercises (Precipitation, Agglutination, ELISA, Western Blot) will be written up and graded using the following outline:

I. Background/General Information
II. Protocol/Experimental Design
III. Results
IV. Conclusions

*Pop quizzes (70 total points) will be given at various times in the quarter at the beginning of class to evaluate your lab preparation and work. There will be no make-up for missed quizzes.*