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COURSE OUTLINE

CHAPTER READING

Sept.	22	History (<i>Knowledge</i>); Virus and Host Cell		1, 2 (13)
	27	Virus Structure; Classification of Viruses		5
	29	Virus Replication Cycle		6
Oct.	4	Host Defense: Vaccine, Interferon, Antiviral Drugs		8
	6	Positive-sense RNA Virus: <i>Picornavirus</i>		14
	11	<i>Togavirus</i>		14
	13	Negative-sense RNA Virus: <i>Rhabdovirus</i>		15
	18	FIRST EXAM (History through <i>Togavirus</i>)		
	20	Negative-sense RNA Virus: <i>Orthomyxovirus</i>		15
	25	Ambi-sense RNA Virus: <i>Bunyavirus</i> ;	C.S. #1, 2	15
	27	Double-strand RNA Virus: <i>Reovirus</i> ;	C.S. #3, 4	15
Nov.	1	Subviral Pathogen : <i>Hepatitis Delta Virus</i> ; <i>Viroid</i> ; <i>Prion</i> ;	C.S. #5, 6, 7	15
	3	Small DNA Virus: <i>Papovavirus</i> ;		16
	8	SECOND EXAM (<i>Rhabdovirus</i> through <i>Prions</i> + <i>Case Study #1-7</i>)		
	10	Medium DNA Virus: <i>Adenovirus</i>		16
	15	Large DNA Virus: <i>Herpesvirus</i> ;	C.S. #8, 9, 10	17
	17	Cytoplasmic DNA Virus: <i>Poxvirus</i> ;	C.S. #11, 12	18
	22	Reverse Transcribing Virus: <i>Retrovirus</i> ;	C.S. #13, 14	19
	24	Give Thanks – It's a Holiday!		
	29	<i>Hepadnavirus</i>		21
Dec.	1	The Future (Imagination)		25
Dec.	6	FINAL EXAM, Tuesday, 1:30 – 4:00 pm (<i>Papovavirus</i> through <i>Hepadnavirus</i> + <i>Case Study #8-14</i>)		

Chapter Reading + Questions in *Basic Virology, Third Edition (2008)*

Class materials available at: <http://instructional1.calstatela.edu/mlee28>

COURSE PREREQUISITE – Course to be taken prior to this class is:

1. MICR 340 (Microbial Genetics) ***or***
2. BIOL 340 (Gen. Genetics) and BIOL 380 (Cell Biology).

The knowledge of nucleic acid and chemistry biosynthesis is necessary for an understanding of virus biology and replication. You must be familiar with the structure and synthesis of RNA, DNA, and proteins. Any recent biochemistry or cell biology textbook, including Chapter 13 (Viruses Use Cellular Processes to Express their Genetic Information) in *Basic Virology*, may be used to review.

COURSE OBJECTIVES – To learn and understand:

1. Virus biology and replication.
2. Virus disease, transmission, prevention and treatment.
3. Host cell response to viral infection.
4. Role of viruses in biology.
5. Creative critical thinking skills.

This course will be based on the biology and replication of the virus. We will compare the major groups of animal viruses and their differing strategies for their replication. We will also examine viral diseases and their epidemiology.

TEXTS – **REQUIRED:** *Basic Virology, Third Edition* by EK Wagner, MJ Hewlett, DC Bloom, and D Camerini (2008) will be the primary text for the class. It is an introductory text that covers the biology, the replication strategy, and the disease process of viruses.

ON RESERVE: *Medical Microbiology, Sixth Edition* by P. R. Murray et al. (2009) is an additional text used for the Case Study reports.

Both texts are on 2 hour Reserve Loan in the Kennedy Memorial Library. Additional useful internet websites are listed in *Basic Virology*.

EVALUATION OF STUDENT'S LEARNING WILL BE BY:

1. *WRITTEN EXAMINATIONS* – Three interval (one hour) examinations will be given. Tentative dates for the first two examinations are given in the course schedule. Exact dates will be announced in advance. The Final Examination is Tuesday, December 6. Each examination will be 100 points and will cover lecture material, assigned text chapter reading + questions, and Case Study reports. Format of the examination will be objective (multiple choice, true-false, identification) and short essay questions. They will challenge you to synthesize the knowledge you learned and to arrive at new concepts.

MAKE-UP EXAMINATION – A comprehensive make-up examination will be given to anyone missing any one of the first two examinations *due to a serious reason*. If you are unable to take an examination, please notify the instructor before if possible or as soon as possible. The instructor must be contacted within one week of the scheduled examination in order to take the make-up examination. The make-up examination will be scheduled about one week after the scheduled examination. The relevant telephone and e-mail address are on the first page to notify the instructor.

2. *GROUP CASE STUDY* - Along with presentation of the viruses in lecture, you will be given patient medical case history along with relevant questions (from *Medical Microbiology*). This will help you to learn and understand the viral diseases. Students will work together in a group randomly selected by the instructor. Each Group will give a 10 minute Case Study presentation to the class and write a short report by discussion of the accompanying questions. Evaluation will be based on the quality of the oral presentation and of the written report (content, communication, teamwork) for an overall Group score (possible total of 50 points). More information will be given later.

GRADE ASSIGNMENT – A total of 350 points is possible. Grades in the course will be based on having earned the following points:

350 – 315	A	EXAMINATIONS	=	300
314 – 280	B			
279 – 245	C	CASE STUDY	=	50
244 – 210	D			_____
below 210	F	TOTAL		350

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:

Successive 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).

B. Edwards *Drawing on the Artist Within: An Inspirational and Practical Guide to Increasing Your Creative Powers*, 1986.

“The formulation of a problem is often more essential than 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. Einstein and L. Infeld *The Evolution of Physics*, 1938.

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.

D. F. Halpern *Thought and Knowledge: An Introduction to Critical Thinking, 2002.*