

Mt. San Jacinto College
Honors Course Outline Addendum

Submitted by:	Shauni Calhoun	Date:	11/12/2020
Course Discipline:	Biology		
Course Number:	BIOL 125H	Honors Courses End in "H"	
Title:	Honors Microbiology	Must begin with "Honors"	

Honors Course Objectives:

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| <ol style="list-style-type: none">1. Reframe thinking about the science of biology by applying rigorous critical analysis, asking questions, reflecting on and discussing topics in biology, and exploring the scientific literature.2. Develop and practice the analytical skills to understand, evaluate, and critique the range of biological topics included in the course.3. Collaborate closely with the instructor and other honors students.4. Develop appropriate skills in presenting and defending ideas, claims, and conclusions, including through discussion, writing, and formal presentations.5. Design and conduct or critique original research in microbiology or the microbiology literature. |
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Honors Course Content:

The topics covered in the honors section are identical to those covered in the regular section. In addition, honors students are introduced to research design, implementation, and analysis. Students will be expected to engage in rigorous discussions, collaborate with the instructor, and design and conduct or critique original research. The honors component of the course encourages students to work beyond the survey level and to explore the concepts included in Microbiology with greater depth and complexity. Students are encouraged to reflect on and discuss historic and current issues in microbiological science including, but not limited to, new and emerging pathogens, the genetics of antibiotic and drug resistance, the impact of microbes on biogeochemical cycles, the health implications of the human microbiome, the evolution symbiosis and mutualisms, the promise and perils of genetic engineering, and the application of microbiology to the food industry.

Honors Course Assignments:

Honors students will complete all the regular course requirements and will be graded first according to the standards used for the regular section. Honors students must, in addition, complete assignments A) and B). They will also complete one of C), D), or E). Assignments F), G), and H) are optional and one or two of these can be completed at the discretion of the instructor. A) Read a book or other written material beyond the scope of the regular section. Readings can be chosen collaboratively among the instructor and honors students, and might include popular science or academic books, journal articles, or other appropriate texts. Contradictory readings on the same topic may be analyzed to encourage critical thinking on various perspectives in biological science. Honors students will meet with the instructor to discuss the reading(s) and may optionally also produce a short one to two page reflection/reaction paper. Examples of appropriate readings include <i>The Gene: An Intimate History</i> by Siddhartha Mukherjee, <i>The Hot Zone: A Terrifying True Story</i> by Richard Preston, <i>The Andromeda Strain</i> by Michael Crichton, <i>The Selfish Gene</i> by Richard Dawkins. B) Give a 10-15-minute oral presentation of the major work done in the honors section, given to fellow honors students, the instructor, or to the entire regular section class.
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C) Produce an in-depth investigation of a topic in microbiology that the student selects in consultation with the instructor. Background research may be conducted in a university library or the equivalent and should be based on primary and secondary sources from the scientific literature, and academic books. A minimum of ten academic sources must be referenced in the project. The instructor may organize student peer reviews of their research proposals, thesis and outlines, or rough drafts of their projects. Students will also submit a 250-word abstract of their work. Examples of in-depth investigation include a survey of the scientific debate over GMOs; an investigation of the history and current status of an emerging infection like Nipah virus, Zika virus or Ebola; the cooptation of genetic research to argue for Caucasian superiority and the reaction of scientists; the scientific controversies over animal research; the causes and consequence of extinction for particular groups of organisms; the prospects and ethical issues raised by gene therapy or cloning; the potential use of microorganisms in data storage, nanotechnology, biotechnology, and oil or plastic clean up. The investigation can be submitted as:

- a) 9-12 page research paper, double-spaced with the usual margins and fonts
- b) Short film
- c) Digital story
- d) Academic poster
- e) Other, as determined in collaboration with the instructor(s)

D) Produce an original research project appropriate to microbiology, microbiology education, or the sociopolitical implications of microbiology. The research project will involve an original investigation consisting of experiments (using available tools of biological research), clinical interviews, surveys, observations, literature reviews, or other appropriate methods. The product of the investigation will be presented as a six to nine page (typed, double-spaced, typical margins and fonts) report. The report will include background information, methods of the research, results and discussion/conclusions. The project will be designed and implemented by the student in consultation with the instructor. Background research may be conducted in a university library or the equivalent and should be based on the following: primary and secondary sources from the scientific literature or academic books. A minimum of six academic sources must be referenced in the paper. As part of this project, students may peer review one another's work. Examples of original research topics include attitudes toward particular microbiology topics (e.g., genetic engineering, vaccination) among a particular group of people; a comparison of different soaps on bacterial populations of human hands; the impact of household chemicals on soil microbes; the study of microorganism diversity at dump sites or local bodies of waters; high school teacher's experience of teaching microbiology concepts.

E) Create a service learning project in consultation with the instructor. Service learning can be differentiated from other volunteer experiences by its focus on the integration of academic learning and providing a service to one's community. Students will volunteer at a local life science institution, museum, nature preserve, national park, laboratory, hospital, or similar location for a total of 10 hours over the course of the semester and enrich their volunteer experience by reading three articles related to the biology relevant to the site of service, hospital care, or similar topics. Students will submit a four to seven-page reflection paper that connects their volunteer experience to themes addressed in the course and assigned readings along with a log of their hours signed by an employee of the institution where they are volunteering. Students may wish to share the content of their reflection with the institution where they volunteered in the form of a lecture, presentation, or suggested action plan that the instructor and other honors students in the course are invited to attend.

F) Interview a microbiologist or medical professional about the purpose, methodology, and significance of their work and how it relates to topics and themes addressed in Biology 125H. Students will collaborate with their instructor to select an appropriate person to interview, develop a set of interview questions, review interview protocols, decide on the best way to preserve and present their findings to the instructor or the class (i.e., a brief write-up of their interview or a short oral presentation), and consider how the individual's research contributes to or challenges current scientific perspectives.

G) Keep a journal on assigned readings and writing assignments. Journal writing will assist students in understanding and reflecting on important subjects of the course and will help students organize their own questions and comments that can be used in class discussions.

H) A project outside regular class time designed by the instructor. For example, instructors will lead a field trip to a lab, waste water treatment plant, yogurt or cheese factory, or brewery, and complete a project associated with the use of microorganisms. The instructor may wish to collaborate with the staff of the site to design a guided tour that is tailored to the specific curriculum of Biology 125H. Students will complete a one to two-page analysis of the exhibition and consider how the artwork on display represents and/or challenges themes addressed in the course. Other activities could include a film viewing such as *The Andromeda Strain*, *Outbreak*, *Contagion*, *Soylent Green*, *Gattaca*. Documentary options could include *Coronavirus: A Global Emergency*, *After Ebola: Nebraska and the Next Pandemic*, *The Vaccine War*, *Invisible Threat*, *Rise of Superbugs*, *Chasing the Nightmare Bacteria*. Students could also attend an academic lecture at a local university or museum.

Evaluation of Honors Course Assignments:

Honors students must successfully complete the regular course and honors assignments to receive honors credit.

Research papers and multimedia projects will be assessed on clarity of argument and presentation, supporting evidence, the number and types of references consulted, depth of analysis, and scientific accuracy. Oral presentations will be evaluated based on lucidity, organization, critical thinking, and originality of argument. Honors class discussions of supplemental readings will be judged based on student preparedness as well as the ability of students to summarize, critically analyze, and provide their own perspective on the assigned readings. For service learning projects, students will be evaluated on their completion of the agreed upon number of volunteer hours as well as the quality of the reflection paper that integrates academic source material and their service learning experience, the number and types of references consulted, depth of analysis, organizational structure, grammar, and the connection back to themes associated with the course. Journal writings, interviews/surveys, museum field trip assignments, and film discussions will be assessed based on quality, organization, accuracy, and how well they address and further illuminate the subject matter of the course.

Additional Methods of Instruction:

Method: Small-Group Discussion

Integration: Guided small group discussions in the honors course will provide a forum for instructors and students to discuss historical trends in and/or the current state of biology as well as analyze and interpret assigned readings or films to gain a deeper understanding of key concepts, people, and events that have shaped modern biology. These discussions can also cover student progress on research projects including research proposals, sources, thesis statements, outlines, and rough drafts as well as peer-reviews of these assignments. Students will meet as a group or individually with the instructor a minimum of once a month for a minimum of four meetings over the course of the semester.

Method: Service Learning Project

Integration: Service learning at biology institutions, museums, or similar locations will help students gain hands-on experience in areas that pertain to the field of biology or medicine. This will be useful to students making decisions about major and career choices and will encourage them to seek out additional volunteer or internship opportunities after the conclusion of the course.

Method: Oral Presentations

Integration: Oral presentations will provide honors students the opportunity of presenting their research projects to their honors colleagues or the regular class to facilitate the development of their presentation and communication skills.

Method: Field Trips

Integration: Students will engage in academic inquiry and discussions of topics in biology by visiting a museum exhibition, going to a film screening, or attending an academic lecture at a nearby university or museum. Museum visits will encourage students to reflect on the impact of science on society while films and lectures provide a means of experiencing

biology through a variety of mediums beyond the classroom.