**VICTOR VALLEY COLLEGE SYLLABUS**

**Spring 2016**



**Course No.: Biology 296H Course Title: Undergraduate Research II**

**Section No.: 59987 Class Hours: Monday 2:40pm – 5:50pm and**

**Room No.: 31-1 Friday 9:35am – 12:55pm**

**Office No.: 6   Instructor Name: Dr. Harvey, Ph.D. Units: 4.0**



**Victor Valley College**

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**Visit Victor Valley College online at** [**www.vvc.edu**](http://www.vvc.edu/)



**Spring Term Begins February 13**

**Presidents Day Lincoln February 17**

**College Closed (no classes) February 18**

**Presidents Day Washington February 20**

**Spring Break (no classes-offices open) April 10 – 14**

**Spring Break Holiday (college closed) April 14**

**College Closed (no classes) April 15**

**Memorial Day Holiday (college closed) May 29**

**Commencement June 9**

**Spring Semester Ends June 10**

**Sixteen (16) week term February 13 – June 10**

**Off-Campus Twelve (12) week term February 13 – May 13 (Does not follow VVC calendar, see that site’s calendar)**

**First Twelve (12) week term February 13 – May 13**

**Second Twelve (12) week term March 13 – June 10**

**First Eight (8) week term February 13 – April 8**

**Second Eight (8) week term April 18 – June 10**

**NOTE** – **CAMPUS IS CLOSED and** **CLASSES WILL NOT BE HELD ON CAMPUS THE FOLLOWING DATES: February, 17th, 18th, 20th, April 10th, 11th, 12th, 13th, 14th, 15th, and May 29th**

STATEMENT OF ACCESS: Students with special needs are encouraged to meet with instructors to discuss the opportunity for academic accommodation and referral to Disabled Students Programs and Services (DSPS) and services per Administrative Procedure (AP 3440)

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**Course Description**

This course allows students to select a research project, write a literature review and research proposal, conduct preliminary experiments, and write a research report. Research methods and experimental design will be emphasized, including the location and study of articles from the professional literature. Undergraduate research helps students develop valuable skills, and provides students with an opportunity to apply scientific knowledge in the context of “real world” problems. Participation will also open up opportunities for students to take part in analyzing data and conducting field research.

**Student Learning Outcomes**

1. Apply quantitative methods to biological problems.
2. Evaluate, and interpret information from a variety of sources (e.g., web, popular media, and scientific publications).
3. Communicate the results of a scientific investigation in written and oral formats.
4. Use scientific instrumentation and information technology.

**Prerequisites**

Biology 100, H100, 107, 201, 202, 221 or 231.

**Textbook(s):** Greene, James ; Castora Phd, Frank J.. *Handbook of Biological Research Methodology*, 1st ed. New York: CRC Press, 2010.

**Attendance**

Attendance is required and is the responsibility of the student. If you do not attend the first class session the instructor will drop you. If you do not plan to continue to attend class you must drop the course to avoid receiving an “F” grade. **PLEASE NOTE:** Each class session is very important. After missing the equivalent to one lecture and one lab, dismissal from the class will result. This is a very fast pace class and it is highly recommended that you do not miss a class.

***(Class attendance is not a measure of performance or proficiency. Whether a student is just physically present in the class is not a valid basis for grading. Reference Title 5 Section 55002 of the California Code of Regulations: (A) Grading Policy. The course provides for measurement of student performance in terms of stated course objectives and culminates in a formal, permanently recorded grade based upon uniform standards in accordance with section 55758 of this Division. The grade is based on demonstrated proficiency in the subject matter and the ability to demonstrate that proficiency, at least in part, by means of written expression that may include essays, or, in courses where the curriculum committee deems them to be appropriate, by problem solving exercises or skills demonstrations by students.)***

**Withdrawal Policy**

It is the student’s responsibility to officially withdrawal from this class. **DO NOT** simply stop coming to class and expect the professor to drop you. Not withdrawing from class may result in an “F” grade for the class. If you take a “W” for the course, no assignments are carried into the next semester. You must repeat the class.

**Incomplete**

If a student has completed most of the course (75% or more) with a “C” or better average, but is unable to complete the remainder of the semester due to extenuating circumstances (see student handbook), they may elect to take an incomplete (INC) for the course. You are allowed to make up all missing assignments. An incomplete does **NOT** allow you to repeat completed assignments. All missed assignments and exams must be completed by the following semester or the grade will revert back to the one they would have earned at the end of this semester. ***It is the student’s responsibility to initiate the request for an incomplete.*** This must be completed in writing on a special school form and signed by both the instructor and the student before the end of the semester.

**Final Grade**

Your final grade is based on the sum of your scores. You may determine your grade at any time during the course by totaling the points you have accumulated and dividing that total by the number of total points possible.

Reading Assignment: Read the chapter assigned for discussion in class.

Quizzes: Students are expected to complete the reading assignment BEFORE coming to class. Quizzes will be given in class, at the discretion of the faculty. Quizzes will address the assigned readings for that class session.

In-Class Activities: Will be designed to help the student understand and work effectively with the class content. Students must read the assignment before class in order to be successful with the in-class learning activities.

Student Presentation/Power Point Presentation: A formal presentation of the research study will be presented in class for a grade.

Research Critical Appraisal: A written critical appraisal of a research study will be completed and submitted for a grade. Students will work in small groups to develop the research critical appraisal.

Articles for Critical Appraisal: Each student group will choose a peer reviewed article for the critical appraisal assignments. **This article must be approved by the professor prior to beginning work on the assignment.**

Examinations: Exam(s) will cover content from class sessions,

assigned text book readings, and any other assigned readings for the course.

Make up exams will be given the week of finals only if the student has (a) called before class to notify faculty of absence, (b) absence is excused, and (c) documentation of excused absence is provided to faculty at next class date. Make-up exam will be given on June 2, 2017. Quizzes cannot be made up.

**Classroom Policies:**

**Etiquette and Ethics**

Although extenuating circumstances occur and you must be late to class, do your best to arrive to class on time. If for some reason you cannot arrive at the assigned time, then please enter the classroom quietly and have consideration for other students and the instructor. Because we are also in an intimate classroom setting any extraneous talking is not appreciated during lecture because it is very distracting to your fellow students and even the instructor.

Please read the college policy on cheating and plagiarism. Academic dishonesty in any form will not be tolerated, and may result in failure of an exam/assignment, failure of the course or expulsion from the college. If you have any questions regarding dishonesty or are in anyway unclear about the meaning of the college policy, please see me immediately. If Academic Dishonesty is observed in the classroom, the assignment will be given a grade of “F” and the student will be expelled from the class for two days.

**Children**

It is the policy of Victor Valley College that children NOT attend class with their parents nor be left unattended on campus while parents attend class. If you qualify, there is a day-care center on campus, if not, please make arrangements for a babysitter.

**No food or drinks**

It is school policy that **NO** food or drinks be allowed in the classroom. Please do not use the small sinks and drawers at the desk as trash receptacles. It is also important to leave all open foodstuffs outside of the classroom, we have a tendency to collect a large herd of ants after awhile. It is not pleasant having them crawl up your pant leg!!!

**PLEASE NOTE:** It is the responsibility of every person at each table to make sure the tabletop is clean after the class session is over. It is also the responsibility of every person at the table to check the sink and drawers to make sure there is not trash in either. After a laboratory procedure it is also the responsibility of everyone at the table to make sure the floors are swept and mopped. If you do not make sure your table and the area

around your table is clean ***there will be a 10-point deduction from every person sitting at that table after any or all class sessions.***

**Lecture Schedule**

A tentative lecture schedule with approximate dates for lecture topics and examinations is included in this syllabus. Materials may be covered at a faster or slower pace, depending upon the circumstances. It is the responsibility of the student to note any and all changes.

##### **Tentative Schedule**

##### **Date Lecture Topics**

The Research Problem

Searching the Literature

Preparing a Literature Review

Elementary Scientific Method

The Design of the Experiments

**March 24 Exam 1**

Elementary Scientific Method

The Design of the Experiments

Participant Selection

The Execution of Experiments

**April 21 Exam 2**

Classifications, Sampling and Measurements

Instrumentation

Execution of the Experiment

Preparing a Research Proposal

**May 26 Exam 3**

The Analysis of Experimental Data

Errors of Measurement

Validity and True Experiments

Writing Reports of Empirical Research

**June 9 Final Exam**

**Critiques**

The student will critique one quantitative study or one qualitative study from a peer reviewed journal. Carefully address each of the guidelines described in your syllabus when critiquing the quantitative or qualitative research reports.

**Instructions:**

1. The student will identify one quantitative and one qualitative scientific research article of interest from any refereed journal to critique. The articles must be approved by the professor.
2. The student will identify one quantitative and one qualitative research article of interest from any refereed journal to critique. The articles must be approved by the professor.
3. Basic Format Guidelines: The student will utilize APA format. Proper grammar, spelling, sentence structure and written expression is expected. The critiques must be computer generated and limited to five (5) pages excluding the cover and reference pages.
4. Photocopy of articles must be submitted with critique.

**Quantitative Critique Guidelines**

1. Title (5 points)
   1. Does the title clearly and concisely describe the study?
   2. Is the population/sample included in the title?
2. Abstract (5 points)
   1. Is an abstract included in the article?
   2. Does the abstract include a statement of the problem, purpose, and/or  hypothesis?
   3. Does the abstract briefly summarize design, methodology, results, and  conclusions?
   4. Is the abstract adequate-why or why not?
3. Confidence in the Findings (5 points)
   1. What are the qualifications and reputation of the investigator/s?
   2. What evidence is there in this report that they are qualified to conduct this study?
   3. Is this article published in a referred journal?
4. Theoretical Framework/Conceptual Framework (10 points)
   1. Is a theoretical or conceptual framework described? If not, does the  absence detract from the significance of the research?
   2. Does the research problem flow naturally from the conceptual framework?
5. Protection of Human Rights (5 points)
   1. Is there evidence of an independent ethics review by a board (IRB) or a  committee?
   2. Has the study been designed to minimize risk and maximize benefits to  participants?
   3. Is there an indication that participants gave voluntary, informed consent?
   4. Is there evidence in the study that individuals can be identified?
6. The Problem (10 points)
   1. Was the problem statement introduced promptly?
   2. Is the problem significant the field of science and is the significance described?
   3. Has the purpose for conducting the research been explained?
   4. What are the research variables and how are they measured/operationalized?
   5. Will an answer to the problem provide insight into clinical applicability of the  problem?
7. Research Questions/Hypotheses (10 points)
   1. Are research questions or hypotheses formally stated? If no, should they be  included?
   2. Do the research questions and hypotheses naturally flow from the research  problem and theoretical framework?
   3. Does each research question or hypothesis contain at least two variables?
   4. Are the research questions or hypotheses worded clearly and objectively? Is a prediction evident?
   5. If there is not a research question or hypothesis, write one for the study and explain why your hypothesis or research question fits the study.
8. Review of the Literature (10 points):
   1. Is the review comprehensive, logical and relevant to the problem?
   2. Is the relationship to the research purpose evident?
   3. Does it include recent research?
   4. Can a case be made for conducting this study based on the review?
9. Research Design (5 points):
   1. What design has been used for the study?
   2. Is the design appropriate for the research question and the purpose of the  research?
   3. Has enough information been given to permit replication?
10. Sampling (10 points):
    1. Is the target population carefully described?
    2. Are sample selection procedures clearly defined?
    3. Does the sampling method fit the research design?
    4. Are potential sample biases described?
    5. Is the sample sufficiently large?
    6. Did the author/authors use power analysis to document that the study size was  adequate or inadequate?
    7. How was sample size justified?
    8. To whom can study results be generalized?
11. Data Collection (10 points):
    1. Describe the instruments used for data collection.
    2. Has rationale been given for the selection of instruments?
    3. Are instruments congruent with the research question?
    4. Are instruments suitable for use with the study sample?
    5. Have procedures for testing the reliability and validity of instruments been  described? Are results sufficient to indicate their use?
12. Quantitative Analysis (10 points):
    1. Do the research design and the study questions fit with the analysis methods  used?
    2. Does the level of measurement of the data fit with the type of statistics used?
    3. Is the link between the analysis and the findings logical and clear?
    4. Is the statistical result presented clearly both in the text as well as in numerical  presentation?
    5. Are graphic displays clear, simple, and accurate?
13. Conclusions and Recommendations (5 points):
    1. What are the assumptions and limitations of the study? Are they listed or do you  have to infer what they are?
    2. Are results of data analysis clearly explained in reference to research questions,  hypothesis and theoretical framework?
    3. What recommendations future research studies have been made? Are these recommendations supported by the data?

**GRADING FOR QUANTITATIVE RESEARCH CRITIQUE**

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| --- | --- | --- |
| **Critique Guidelines** | **Possible Points** | **Points Earned** |
| Title | 5 Points |  |
| Abstract | 5 Points |  |
| Confidence in Findings | 5 Points |  |
| Theoretical Framework | 10 Points |  |
| Protection of Human Rights | 5 Points |  |
| The Problem | 10 Points |  |
| Research Questions/Hypotheses | 10 Points |  |
| Review of the Literature | 10 Points |  |
| Research Design | 5 Points |  |
| Sampling | 10 Points |  |
| Data Collection | 10 Points |  |
| Quantitative Analysis | 10 Points |  |
| Conclusions and Recommendations | 5 Points |  |
| Total Possible Points | 100 Points |  |

**The Research Proposal**

The student is to develop a research proposal related to a clinical problem or scientific problem. This project is to help students develop skill in the research process and to sensitize them to the paucity of research. This paper must be computer generated. Students are to submit two copies of the finished proposal on the assigned date.

**Problem section**

1. Statement of the Problem
2. Background and Significance of the problem (Be succinct; include only key references and a brief statement of the problem)
3. Statement of the purpose (Use present tense) (State the purpose in one or two sentences, e.g., The purpose of the study is.)

**Review of the Literature**

1. Introduction (this gives the reader direction for the content covered in this chapter. Generally, one brief paragraph is sufficient).
2. Review relevant theoretical literature (use present tense)
3. Review relevant research (use present tense)
4. Summary Discuss the existing scientific knowledge base of your research problem. Identify gaps in the knowledge base and make a link to your study.

**Theoretical or Conceptual Framework**

1. Introduction to framework
2. Present a theoretical framework or conceptual model.
3. Explain the model (describe relationships among concepts and define relevant concepts)
4. Link the model to the study purpose

**Statement of Research Questions, or Hypotheses**

1. Clearly state the research question or hypothesis.
2. Describe and label the variables, e.g. independent, dependent, or research.
   1. Define the major variables
   2. List variables and the operational definitions of each
   3. Define relevant terms, as needed (define important terms that may have multiple meanings and that need to be clarified for the purpose of your study)

**Methods and Procedures**

1. Introduction (gives reader the direction for the content covered in this chapter).
2. Identification of Research Design (Usually 2-3 sentences are sufficient. A model might be helpful for complex designs).
3. Identification of the Sample and Setting 4. Identify the sampling criteria to designate the target population.
4. Discuss sample size
5. Identify the sampling method.
6. Description of the Setting

**Discussion of Measurement Methods**

Explain the measurement method to be used in the study. (e.g. physiologic measure, survey, or questionnaire), address the following:  Describe the measurement method Attach copies of measurement instrument in Appendix.

1. Describe the scoring of the method.
2. Briefly, discuss reliability and validity of instrument.
3. Reliability.
4. Types of Construct Validity.

**Discussion of Procedure**

Explain in detail the step-by-step description of the procedure and describe procedures for data collection.  Place samples of data collection forms in the Appendix and refer to them in procedure section. Describe plan for organizing, recording, and storing data (generally, 3-5 sentences are sufficient).

**Presentation of Ethical Considerations**

1. Discuss procedure for obtaining informed consent as well as explanation that will be given to subjects.

**Plan for Data Analysis**

1. Discuss analysis of research question or hypotheses and describe data analysis.

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| --- | --- | --- |
| **Critique Guidelines** | **Possible Number of Points** | **Earned Number of Points** |
| The Problem | 5 points |  |
| Background and Significance of the Problem | 5 points |  |
| Theoretical or Conceptual Framework | 10 points |  |
| Questions or Hypotheses | 10 points |  |
| Review of the Literature | 10 points |  |
| Research Design | 10 points |  |
| Sample and Setting | 10 points |  |
| Measurement Methods/ Research Instruments | 10 points |  |
| Discussion of the Procedure | 10 points |  |
| Ethical Considerations | 10 points |  |
| Plan Data Analysis | 10 points |  |
| Total Possible Points | 100 |  |

LAB SCHEDULE - TBA