

**California State University, San Marcos General Education Program  
GENERAL EDUCATION NEW COURSE CERTIFICATION REQUEST**

• **AREA B2: Life Science with a Lab Component**  
See *GE Handbook* for information on each section of this form  
**ABSTRACT**

Course Abbreviation and Number: <b>GES 102</b>		Course Title: <b>Matter, Molecules, Life, and the Environment II</b>	
Number of Units: <b>3</b>			
College or Program: <input type="checkbox"/> CHABSS <input checked="" type="checkbox"/> CSM <input type="checkbox"/> CEHHS <input type="checkbox"/> COBA <input type="checkbox"/> Other _____		Desired term of implementation: <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer Year:	Mode of Delivery: <input checked="" type="checkbox"/> face to face <input type="checkbox"/> hybrid <input checked="" type="checkbox"/> fully on-line <i>have both</i>
Course Proposer (please print): John Hakanson		Email: hakanson@csusm.edu	Submission Date:



**1. Course Catalog Description:**

The second of a two-semester course consisting of integrated modules covering the areas of matter/energy, molecules, living systems, and environment. These modules will cover major concepts in the physical and biological sciences, emphasizing their application to real-world problems. Concepts covered will include the interactions of matter and energy, laws of motion, atomic structure of matter, structure and properties of molecules, principles of genetics, structure and function of living organisms, evolution, and interactions of organisms with each other and their environment. Includes practical experience in the application of the scientific method through laboratory activities. Enrollment restricted to students who have completed the Entry-Level Mathematics (ELM) requirement.

**2. GE Syllabus Checklist: The syllabi for all courses certified for GE credit must contain the following:**

<input checked="" type="checkbox"/>	Course description, course title and course number
<input checked="" type="checkbox"/>	Student learning outcomes for General Education Area and student learning objectives specific to your course, linked to how students will meet these objectives through course activities/experiences
<input checked="" type="checkbox"/>	Topics or subjects covered in the course
<input type="checkbox"/>	Registration conditions
<input checked="" type="checkbox"/>	Specifics relating to how assignments meet the writing requirement
<input checked="" type="checkbox"/>	Tentative course schedule including readings
<input checked="" type="checkbox"/>	Grading components including relative weight of assignments

**SIGNATURES**

	<u>10/21/14</u>		<u>10/21/14</u>
Course Proposer	Date	Department Chair	date
<i>Please note that the department will be required to report assessment data to the GEC annually.</i>			
		<u>DC Initial</u>	
	Support <input type="checkbox"/> Do not support* <input type="checkbox"/>	Support <input type="checkbox"/> Do not support* <input type="checkbox"/>	
Library Faculty	Date	Impacted Discipline Chair	Date
	Support <input type="checkbox"/> Do not Support* <input type="checkbox"/>	Approve <input type="checkbox"/> Do not Approve <input type="checkbox"/>	
Impacted Discipline Chair	Date	GEC Chair	Date

\* If the proposal is not supported, a memo describing the nature of the objection must be provided.

Course Coordinator:      Phone:      Email:

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*Part A: B2 Life Science General Education Learning Outcomes (GELOs) related to course content. [Please type responses into the tables.]*

<b>Life Science GELOs this course will address:</b>	<b>Course content that addresses each GELO.</b>	<b>How will these GELOs be assessed?</b>
B2.1: Students will state or identify accepted modern biological principles and/or use knowledge of those principles to solve problems in the biological sciences.	Course covers all structural levels of biological organization, from the role of different biological molecules in biochemical processes to the interactions found in the whole biosphere. The workings of the cell, including mitosis, meiosis, photosynthesis, fermentation and cellular respiration are covered, and so is the role of genes, and interaction between genes, in perpetuating life through subsequent generations of cells. Biotechnology is covered to prepare the students for understanding the potential value of future biotechnological discoveries and their implications in our everyday lives. The importance of genetic diversity in populations is stressed and so is the role of microevolution and evolution in developing and maintaining such diversity. We cover the diversity of life from bacteria to humans, and proceed to various aspects of ecology, from population ecology, through communities, ecosystems and finally the biosphere. The last portion of the course looks at the effect of human impact on the environment, as well as a lecture on animal behavior.	Student understanding of each aspect of the course content is assessed through weekly quizzes, and again on the Midterm and Final Exam. Laboratory component will engage in hands-on activities and biological experiments to familiarize students with the applications of biological theory.
B2.2: Students will describe and apply the discipline's primary methods to problems through hypothesis development, critical evaluation of evidence, data collection, fieldwork, and/or employment of mathematical and computer analysis.	Students will go through the steps of the Scientific Method and understand how to apply it to conduct a valid scientific experiment. Some labs, such as microscopy, are fairly descriptive, but most require students to state their hypothesis, perform controlled experiments, and then analyze and evaluate their results. Each lab also requires students to explain how they might use the knowledge they gained during the lab activity in their own life.	To make sure students are prepared, a lab quiz is given prior to the actual lab work. Students are required to keep a detailed laboratory notebook, where each of their laboratory activities is entered. Each lab requires the Introduction and Objectives section to be completed prior to the lab. After the lab is completed, students write a Results and Analysis section, and lab notebooks are collected and graded at regular intervals.
B2.3: Students will describe various theories relevant to the discipline.	Laws of thermodynamics will be presented and their implications discussed for the maintenance of biological systems. The theory of	Students will be given quiz and exam questions that require them to understand why biological systems from cells

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	evolution will be presented in the context of the scientific results available that led to the development of the theory, and the importance of the theory will be stressed as the mechanism for the development and interrelationship between the species diversity of today.	to ecosystems require an input of energy. The students will apply their knowledge of the process of evolution to understand how the major groups of plants and animals evolved.
B2.4: Students will identify the limitations of scientific endeavors.	Course will discuss how valid scientific methods must be testable and falsifiable. The difference between doing correlational analyses and determining causal relationships between variables will be covered, as well as how sample bias can easily skew results.	Students will be given quiz and exam questions that require them to understand what components are required to do a valid scientific experiment. They will perform laboratory experiments, write a detailed laboratory notebook, which is collected and graded.
B2.5: Students will identify and consider the value systems and ethics associated with human inquiry.	Course will discuss potential ethical implications of implementing aspects of present and future biotechnological discoveries, within the medical and the environmental fields, for example.	Student understanding will be assessed through classroom feedback.
B3.1 Students will demonstrate that they can conduct experiments, make observations, or run simulations using protocols and methods common in the scientific discipline in which the course is offered.	Students will attend weekly labs in which they must follow experimental protocols. Some experiments will be partly of their design and others will be simulations. For example, to demonstrate techniques common in biotechnology, they will collect their own DNA from cheek cells, and use gel electrophoresis to determine if they have a particular gene sequence	Students are required to keep a detailed laboratory notebook, where each of their laboratory activities is entered. Each lab requires the Introduction and Objectives section to be completed prior to the lab. This graded portion will indicate how well they understand the background and purpose of the experiment and how well they can follow the methods and protocols.
B3.2 Students will be able to interpret the results of experiments, observations or simulations, understanding random and systematic errors associated with those activities, and making appropriate conclusions based on theories or models of the scientific discipline in which the course is offered.	Again, during the weekly lab activities, students will be performing experiments and simulations. They are required to interpret their results, discuss any errors or issues that came up during the process and answer questions specific to the activity.	After the lab is completed, students write a Results and Analysis section, and lab notebooks are collected and graded at regular intervals. They also must provide a brief explanation (1 paragraph) as to how they might use the knowledge you gained during the lab activity in their own lives.

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*Part B: General Education Learning Outcomes required of all GE courses related to course content:*

<b>GE Outcomes required of <u>all</u> Courses</b>	<b>Course content that addresses each GE outcome?</b>	<b>How will these GELOs be assessed?</b>
Students will communicate effectively in writing to various audiences. (writing)	Students will fulfill the university writing requirements by completing all exercises and answering all questions posed regarding the experiments in their laboratory notebooks.	Students regularly submit their lab notebooks for grading and comments.
Students will think critically and analytically about an issue, idea or problem. (critical thinking)	Students will analyze what potential biases may exist for a given experimental procedure and critically evaluate how that might impact what conclusions may be drawn. Pros and cons of different approaches will be considered when it comes to using specific global resources, i.e. global warming, but also important local issues such as water use and allocation in California.	Students will be given quiz and exam questions that require them to consider various aspects of global resource use.
Students will find, evaluate and use information appropriate to the course and discipline. (Faculty are strongly encouraged to collaborate with their library faculty.)	In a lab exercise groups of students will represent the different organelles of a living cell. The assumption is that in a tough market one organelle needs to be eliminated. Each group gathers information necessary to justify why their particular organelle should not be the one that is eliminated.	Each student group will do a presentation for the whole lab section, where they justify the importance of their organelle.

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**Part C: GE Programmatic Goals: The GE program aligns with CSUSM specific and LEAP Goals. All B2 courses must meet at least one of the LEAP Goals.**

<b>GE Programmatic Goals</b>	<b>Course addresses this LEAP Goal:</b>
LEAP 1: Knowledge of Human Cultures and the Physical and Natural World.	<input type="checkbox"/> No    x <input checked="" type="checkbox"/> Yes
LEAP 2: Intellectual and Practical Skills	x <input type="checkbox"/> No <input type="checkbox"/> Yes
LEAP 3: Personal and Social Responsibility	x <input type="checkbox"/> No <input type="checkbox"/> Yes
LEAP 4: Integrative Learning	<input type="checkbox"/> No    x <input checked="" type="checkbox"/> Yes
<b>CSUSM Specific Programmatic Goals</b>	<b>Course content that addresses the following CSUSM goals. Please explain, if applicable.</b>
CSUSM 1: Exposure to and critical thinking about issues of diversity.	x <input type="checkbox"/> No <input type="checkbox"/> Yes (please describe):
CSUSM 2: Exposure to and critical thinking about the interrelatedness of peoples in local, national, and global contexts.	? <input type="checkbox"/> No <input type="checkbox"/> Yes (please describe):

**Part D: Course requirements to be met by the instructor.**

<b>Course Requirements:</b>	<b>How will this requirement be met by the instructor?</b>
Course meets the All-University Writing requirement: A minimum of 2500 words of writing shall be required in 3+ unit courses.	Students will fulfill the university writing requirements by completing all components required in their detailed laboratory notebooks.
Courses in the life sciences will take as their primary focus such concepts found in traditional life science disciplines (e.g., levels of organization of living systems, from molecules to ecosystems, structures and functions of living organisms, principles of genetics, patterns and theories of evolution, interactions of organisms with each other and their environment).	Each of the course requirements are covered as part of the course material.
Courses will require students to develop an understanding of the core information sources and the literature of the science disciplines.	Original studies will be referenced as a foundation for the development of each science discipline.
Courses will require students to think critically so that they are able to distinguish scientific arguments from pseudo-scientific myths or opinions.	The scientific principles presented will help students weed out pseudo-scientific myths or arguments presented in the popular media.

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**GES 102 Syllabus**

**Introduction:**

The second of a two-semester course consisting of integrated modules covering the areas of matter/energy, molecules, living systems, and environment. These modules will cover major concepts in the physical and biological sciences, emphasizing their application to real-world problems. Concepts covered will include the interactions of matter and energy, laws of motion, atomic structure of matter, structure and properties of molecules, principles of genetics, structure and function of living organisms, evolution, and interactions of organisms with each other and their environment. Includes practical experience in the application of the scientific method through laboratory activities

**General Education Learning Outcomes:**

B2.1. Students will state or identify accepted modern biological principles and/or use knowledge of those principles to solve problems in the biological sciences.

B2.2 Students will describe and apply the discipline's primary methods to problems through hypothesis development, critical evaluation of evidence, data collection, fieldwork, and/or employment of mathematical and computer analysis.

B2.3 Students will describe various theories relevant to the discipline.

B2.4 Students will identify the limitations of scientific endeavors.

B2.5: Students will identify and consider the value systems and ethics associated with human inquiry

**Specific Course Learning Objectives:**

1. Students will state or identify accepted modern biological principles and/or use knowledge of those principles to solve problems in the biological sciences.
2. Students will describe and apply the discipline's primary methods to problems through hypothesis development, critical evaluation of evidence, data collection, fieldwork, and/or employment of mathematical and computer analysis.
3. Students will describe various theories relevant to the discipline.
4. Students will identify the limitations of scientific endeavors.
5. Students will identify and consider the value systems and ethics associated with human inquiry.

**Required Course Materials:**

Lecture Text: Life, 6th edition, by Lewis et al., McGraw Hill  
(any edition of Life will work)

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**Laboratory:** GES 102 Lab Manual, by Hakanson.

**Course Evaluation:** Grades will be assigned based on the total points in both the lecture and laboratory components of the course. The laboratory portion will make up 1/3 of the total course grade.

The course be divided and taught in modules, based on two general content areas.

**Module 1** deals with biological topics/concepts pertaining to cellular structure and function, DNA structure/technology, and fundamental principles of heredity and human genetics.

**Module 2** covers topics pertaining to evolution, population growth and dynamics, ecosystem ecology, human impact on the environment, and animal behavior.

**Grading – Lecture portion of course:**

Six quizzes, each worth 20 points, will be given during each module, and the two lowest quiz scores for the semester will be dropped.

There will also be a comprehensive exam worth 100 points at the end of each module.

NO make-up quizzes or exams will be allowed without prior arrangement!

**LECTURE SCHEDULE**

**Introduction**

**Lecture 1 – Scientific Method**

No chapter in textbook.

**Lecture 2 - What is Life? Chemistry of Life.**

Chapters 1+2.

**Lecture 3 - Chemistry of Life cont.**

Chapter 4 +QUIZ #1.

**Lecture 4 - Cells**

Chapter 4.

**Lecture 5 - Cell Structure**

Chapter 5 +QUIZ #2.

**Lecture 6 – The Energy of Life**

Chapter 6.

**Lecture 7 - Photosynthesis**

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Chapter 7 +QUIZ #3.

**Lecture 8 – How Cells Release Energy**

Chapter 8.

**Lecture 9 - The Cell Cycle**

Chapter 9 +QUIZ #4.

**Lecture 10 – Meiosis**

Chapter 10.

**Lecture 11 – How Inherited Traits Are...**

Chapter 11 +QUIZ #5.

**Lecture 12 – Chromosomes**

Chapter 12.

**Lecture 13 – On Genomes**

Chapter 13 +QUIZ #6.

**Lecture 14 - Practice Midterm**

**Midterm**

**Lecture 2-1 - Evolution**

Chapters 15+18.

**Lecture 2-2 - Microevolution**

Chapter 16 +QUIZ #2-1.

**Lecture 2-3 - Speciation**

Chapter 17.

**Lecture 2-4 - Early Earth**

Chapter 19 +QUIZ #2-2.

**Lecture 2-5 - Diversity of Life**

Chapters 23 + 26.

**Lecture 2-6 - Homeostasis**

Chapter 39 +QUIZ #2-3.

**Lecture 2-7 - Population Growth**

Chapter 43.

**Lecture 2-8 - Communities**

Chapter 44 +QUIZ #2-4.

**Lecture 2-9 - Ecosystems**

Chapter 44.

**Lecture 2-10 - Biosphere**

Chapter 45 +QUIZ #2-5.

**Lecture 2-11 - Environ. Challenges**

Chapter 46.

**Lecture 2-12 - Animal Behavior**

Chapter 42 +QUIZ #2-6.

**Lecture 2-13 - Practice Final Exam**

**Final Exam**



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**Lab Course Description:**

The laboratory component of GES 102 is designed to increase your understanding of the biological concepts introduced in the lecture portion of the course. You will engage in hands-on activities and biological experiments to familiarize yourself with the applications of biological theory. The course is structured such that the information presented represents aspects of biology that are pertinent to non-science majors.

**Lab Course Objectives:**

1. To familiarize you with the various topics in biology ranging from a microscopic cell to an entire population.
2. To provide a basic understanding of the techniques used by scientists that effect your life.
3. To promote critical thinking skills in the students, as pertains to understanding real-world applications of biological theory.

**Attendance Policy:**

Attendance in the labs is mandatory. Any student missing a lab period without prior knowledge and consent of the instructor will not be permitted to turn-in any assignments relating to the missed class. This includes both the lab quiz and the notebook assignment. In addition, any student more than 15 minutes late to class will not be admitted, and will be considered absent for that lab period.

Because this course is a laboratory, certain rules of conduct and safety apply. If your instructor feels that you are acting inappropriately, or in a manner deemed unsafe to yourself, your classmates, or your instructor, you will be asked to leave the class immediately.

**Grading – Lab portion of course:**

Your performance in the laboratory portion of GES 102 will be determined using the following criteria:

Point totals will be combined with that of the lecture portion and a single grade will be given for the course.

Late assignments will be penalized by a 25% deduction in points per day late. Assignments one day late will receive a maximum of 75%, assignments two days late will receive a maximum of 50%, and assignments three or more days late will receive no credit.

10 Lab assignments (15 pts ea.)

150 points

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10 Quizzes (5 pts ea.) 50 points

Lab Total 200 points

**Quizzes:**

A short quiz will be given during the first five minutes of the lab concerning the day's activity. These quizzes will cover the background information presented in your lab manual.

For this reason, it is essential that you read the "Background", "Introduction", and "Methods" sections of your lab activities before coming to class.

**Lab Notebook Assignments (meets University Writing Requirement):**

You will be responsible for keeping a detailed laboratory notebook. The "Introduction and Objective" section must be completed prior to coming to class. These will be checked and initialed by your instructor during the lab period and incomplete entries will not receive full credit.

At specified times throughout the semester, your notebook will be collected and graded. The following is designed to help you organize your notebook effectively. If you are concerned about the organization of your lab notebook or have any questions, it would be in your best interest to discuss your concerns with your instructor prior to turning it in.

- Introduction and Objectives: (5 points)
  1. A brief introduction (1-2 paragraphs) in your own words including the background information necessary to understand the day's activity and how the activity relates to any real-world applications. This is not simply for regurgitating the information written in your lab manual.  
[All University policies concerning plagiarism will be strictly adhered to.]
  2. A list of the objectives for the proposed activities.
- Results and Analysis: (5 points)
  1. All observations and data collected during the lab period.
  2. Answers to the questions at the end of each lab activity.
  3. A brief explanation (1 paragraph) as to how you might use the knowledge you gained during the lab activity in your own life.
- Participation: (5 points)
  1. Weekly participation includes cleanup, attendance, attitude, etc...

**LABORATORY SCHEDULE**

Lab 1: Introduction, safety sheets

Lab 2: UV Radiation

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Lab 3: Cells, organelles

Lab 4: Enzymes

Lab 5: Photosynthesis

Lab 6: Mendelian Inheritance – Yeast

Lab 7: DNA Profile Analysis, Part 1

Lab 8: DNA Profile Analysis, Part 2

Lab 9: Evolution – Natural Selection

Lab 10: Population Simulation

Lab 11: Allelopathy in Plants, Part 1

Lab 12: Allelopathy in Plants, Part 2

**Course Grades:**

A = 92% of the total points possible

A- = 90-91%

B+ = 88-89%

B = 82-87%

B- = 80-81%

C+ = 78-79%

C = 72-77%

C- = 70-71%

D+ = 68-69%

D = 62-67%

D- = 60-61%

F = <60%

Students will be expected to adhere to standards of academic honesty and integrity, as outlined in the Student Academic Honesty Policy. All written work and oral presentation assignments must be original work. All ideas/material that are borrowed from other sources must have appropriate references to the original sources. Students are responsible for honest completion of their work including examinations. There will be no tolerance for infractions. If you believe there has been an infraction by someone in the class, please bring it to the instructor's attention. The instructor reserves the right to discipline any student for academic dishonesty, in accordance with the general rules and regulations of the university. Disciplinary action may include the lowering of grades and/or the assignment of a failing grade for an exam, assignment, or the class as a whole. Incidents of Academic Dishonesty will be reported to the

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Dean of Students. Sanctions at the University level may include suspension or expulsion from the University.

*The Academic Dishonesty Definitions can be found  
at <http://www.csusm.edu/dos/studres/cheating11.html>*

From: Julie Jameson  
Sent: Tuesday, October 21, 2014 9:08 PM  
To: Marshall Whittlesey  
Cc: Tracey Brown  
Subject: GES 102  
Attachments: GES102.pdf

Hi Marshall,  
I have attached GES 102 for recertification. As you can see below we are working on GES 103 as well (hopefully next week). Library approval is in the e-mail below for 102.  
Best,  
Julie

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Julie Jameson, PhD  
Assistant Professor  
California State University, San Marcos  
Science Hall I, Room 317  
333 S. Twin Oaks Valley Road  
San Marcos, CA 92096  
760-750-8274  
jjameson@csusm.edu

From: Talitha Matlin <tmatlin@csusm.edu>  
Date: Tuesday, October 21, 2014 11:54 AM  
To: jjameson <jjameson@csusm.edu>  
Subject: Re: Library signature for GES 102 and GES 103

Hi Julie,

Yvonne forwarded these on to me to review. In regards to the GELO “students will find, evaluate and use”, GES 102 looks good.

For GES 103, however, the proposal indicates that students will find and evaluate, but doesn't indicate how students will use the information. Typically, to fulfill this GELO, students have to present the information in some way (not necessarily a research paper); it could be in the journal as the proposal states, but the specific assignment should be specified. Beyond submitting their journals for grading and comments, what do students actually have to do with the information (it can still be presented in their journals, the format doesn't really matter)? Will they have to summarize news articles that they find related to the course? Make arguments based on articles they find?

Let me know if you want to chat about this. I am also happy to work directly with the course proposer if you think that would be appropriate.

Thanks,  
Talitha

From: Yvonne Meulemans <ymeulema@csusm.edu>  
Date: Tuesday, October 21, 2014 at 10:52 AM  
To: tmatlin <tmatlin@csusm.edu>  
Subject: FW: Library signature for GES 102 and GES 103