SYSTEMATICS

BIOL 5407

4 Credit Hours

Instructor: Dr. Clifton F. Albrecht

Office: WSB 218

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Office Hours: By appointment.

Lecture Time: Tuesday/Thursday, 8am – 9:15 am

Lab Time: Thursday, 1:30pm – 3:15pm

Classroom: WSB 206

Textbook: No textbook is required. Required r eading will be distributed via Blackboard.

Course Description: This course covers basic concepts of biological systematics. Specific examples of the use of morphological, anatomical, developmental, and molecular evidence in reconstructing the evolutionary history of animals, plants, and bacteria are given.

Course Structure: The course is organized into four sections. Each section includes three lectures, three student-led discussions, and three labs. The four sections cover: (1) concepts of systematics, evolution, and taxonomy (weeks 1-3); (2) morphological evidence for phylogeny (weeks 4-6); (3) anatomical and developmental evidence for phylogeny (weeks 7-9); and (4) genetic evidence for phylogeny (weeks 10-12). Within each section, one lecture and its paired student-led discussion will focus on case studies from animal, plant, and bacterial systematics.

Grading:

Assignment	Points/Assignment	Number	Points Total	Fraction of Overall Grade (%)
Lecture Attendance	10	12	120	15
1-Page Lecture Summary	10	12	120	15
1-Page Paper Summary + 5x Questions	10	12	120	15
Class Discussion Participation (In-Person)	10	12	120	15
Lab (Incl. Pre-Lab)	10	11	110	13.75
Systematics Final Project Draft (Presentation)	10	4	40	5
Systematics Final Project Draft (Paper)	10	4	40	5
Systematics Final Project (Presentation)	65	1	65	8.125
Systematics Final Project (Paper)	65	1	65	8.125
		Points Total =	**800**	

Attendance: Attendance at all lectures, student-led discussions, and labs is required. Absences will be allowed for need on a case-by-case basis. Any absence should be communicated to me well in advance. Absences which are not communicated to me in advance, or which I do not explicitly approve, will be penalized by a full loss of credit for that activity unless caused by a documented emergency.

Late work: Assignments submitted late will automatically receive a penalty of two points if submitted on the day of the deadline. 10% of the assignment's weight will be deducted from the grade awarded on all subsequent days until submission. Lab assignments will not be considered late until 5pm on the day of the lab to allow ample time for completion.

Lecture Schedule

WEEK		TOPIC	DUE AT BEGINNING OF CLASS
Week 1	**Aug 26**	Lecture 1: Syllabus	
	Aug 28	Student Discussion 1	Lecture summary; Paper Summary; 5 Questions
Wk. 2	**Sep 2**	Lect. 2: Systematics: An Overview	
	Sep 4	Stud. Disc. 2	Lecture summary; Paper Summary; 5 Questions
Wk. 3	**Sep 9**	Lect. 3: Evolution: An Overview	
	Sep 11	Stud. Disc. 3	Lecture summary; Paper Summary; 5 Questions
Wk. 4	**Sep 16**	Lect. 4: Morphology – Animals	Phylo. Presentation Introduction Section Draft (Written); Phylo. Presentation Introduction Section Draft (Presentation)
	Sep 18	Stud. Disc. 4	Lecture summary; Paper Summary; 5 Questions
Wk. 5	**Sep 23**	Lect. 5: Morphology – Plants	
	Sep 25	Stud. Disc. 5	Lecture summary; Paper Summary; 5 Questions
Wk. 6	**Sep 30**	Lect. 6: Morphology – Bacteria	
	Oct 2	Stud. Disc. 6	Lecture summary; Paper Summary; 5 Questions
Wk. 7	**Oct 7**	Lect. 7: Anatomy/Dev. – Animals	Phylo. Presentation Morphology Section Draft (Written); Phylo. Presentation Morphology Section Draft (Presentation)
	Oct 9	Stud. Disc. 7	Lecture summary; Paper Summary; 5 Questions
Wk. 8	**Oct 14**	Lect. 8: Anatomy/Dev. – Plants	
	Oct 16	Stud. Disc. 8	Lecture summary; Paper Summary; 5 Questions
Wk. 9	**Oct 21**	Lect. 9: Anatomy/Dev. – Bacteria	
	Oct 23	Stud. Disc. 9	Lecture summary; Paper Summary; 5 Questions
Wk. 10	**Oct 28**	Lect. 10: Genetics – Animals	Phylo. Presentation Anatomy/Dev. Section Draft (Written); Phylo. Presentation Anatomy/Dev. Section Draft (Presentation)
	Oct 30	Stud. Disc. 10	Lecture summary; Paper Summary; 5 Questions
Wk. 11	**Nov 4**	Lect. 11: Genetics – Plants	
	Nov 6	Stud. Disc. 11	Lecture summary; Paper Summary; 5 Questions
Wk. 12	**Nov 11**	Lect. 12: Genetics – Bacteria	
	Nov 13	Stud. Disc. 12	Lecture summary; Paper Summary; 5 Questions
Wk. 13	**Nov 18**	Phylo. Pres. Prep 1	Phylo. Presentation Genetics Section Draft (Written); Phylo. Presentation Genetics Section Draft (Presentation)
	Nov 20	Phylo. Pres. Prep 2	Phylogenetics Paper [DUE AT BEGINNING OF LAB]; Phylogenetics Presentation [DELIVERED DURING LAB]
Wk. 14	**Nov 24 -28**	Thanksgiving – No class	
Wk. 15	**Dec 2**	Class Does Not Meet	

Lab Schedule

WEEK	LAB NUMBER	LAB TOPIC
Week 1 **Aug 28**	No Lab	
Wk. 2 **Sep 4**	1	Phylogenetic Trees and Linnaean Taxonomy (Animals)
Wk. 3 **Sep 11**	2	Phylogenetic Trees and Linnaean Taxonomy (Plants)
Wk. 4 **Sep 18**	3	Phylogenetic Trees and Linnaean Taxonomy (Bacteria)
Wk. 5 **Sep 25**	4	Morphology and Systematics (Animals)
Wk. 6 **Oct 2**	5	Morphology and Systematics (Plants)
Wk. 7 **Oct 9**	6	Collections Visits
Wk. 8 **Oct 16**	7	Embryology (Animals)
Wk. 9 **Oct 23**	8	Embryology (Plants)
Wk. 10 **Oct 30**	9	Endosymbiosis (Bacteria)
Wk. 11 **Nov 6**	10	Genetics (Animals)
Wk. 12 **Nov 13**	11	Genetics (Plants)
Wk. 13 **Nov 20**	12	Phylogenetic Presentations

STUDENT LEARNING OUTCOMES (SLOS): The biology student graduating with a BS in Biology should be able to:

1) The student will be able to demonstrate an understanding of basic biological concepts, including but not limited to evolution via natural selection, cell theory, and the role and function of DNA.

2) The student will be able to demonstrate the utilization of various field techniques toward addressing scientific questions in the specific discipline. These field techniques can include, but are not limited to, plant collection and processing, various animal collection techniques, ecological surveying and sampling, and biodiversity indexing.

3) The student will be able to use biological instrumentation to solve biological problems using standard observational strategies.

4) The student will develop writingskills by summarizing and critiquing recent relevant biological literature.

CORE OBJECTIVES ADDRESSED:

1) Communication Skills – Students will effectively communicate the results of scientificinvestigations, using oral, written, and visual communication, either in group discussions or on written exams.

2) CriticalThinking Skills – Students will include creative thinking, innovation, inquiry, and analysis required to relate new information with previous information in a way that demonstrates the diversity and similarity due to evolutionary ancestry.

3) Empirical and Quantitative Skills – Students will use basic math skills to solve problems (e.g., related to genetic outcomes, cellular energy production, and probability) resulting in informed conclusions.

4) Teamwork Skills – Students will work effectively with others to support a shared goal during lab sessions on activities, such as dissections, problem-solving, and other experimental procedures.

MARKETABLE SKILLS: A student getting a degree in the biological sciences would be expected to acquire the following marketable skills by graduation.

1) Students will be able to organize, analyze, and interpret data.
2) Students will be proficient at using presentation software.
3) Students will acquire experience in managing time and meeting deadlines.
4) Students will gain the ability to speak effectively and write concisely about scientific topics.
5) Students will acquire experience and guidance in the development of professional email correspondence.

SRSU Attendance Policy. Roll will be taken during each class meeting. The SRSU catalog states "The instructor may, at their discretion, drop a student from a course when the student has a total of nine absences in lecture and three absences in lab. An absence is defined as non-attendance in fifty minutes of class.

Academic Integrity. Students in this class are expected to demonstrate scholarly behavior and academic honesty in the use of intellectual property. A scholar is expected to be punctual, prepared, and focused; meaningful and pertinent participation is appreciated. Examples of academic dishonesty include but are not limited to: Turning in work as original that was used in whole or part for another course and/or professor; turning in another person's work as one's own; copying from professional works or internet sites without citation; collaborating on a course assignment, examination, orquiz when collaboration is forbidden.

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Technical Support. SRSU 24/7 Blackboard Technical Support: Phone: 888.837.6055. Email: blackboardsupport@sulross.edu

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