

Washtenaw Community College Comprehensive Report

BIO 227 Biology of Animals Effective Term: Spring/Summer 2020

Course Cover

Division: Math, Science and Engineering Tech

Department: Life Sciences

Discipline: Biology

Course Number: 227

Org Number: 12110

Full Course Title: Biology of Animals

Transcript Title: Biology of Animals

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Consultation with all departments affected by this course is required.

Course description

Outcomes/Assessment

Objectives/Evaluation

Rationale: BIO227 has not been assessed and updated for several years. The master syllabus was updated prior to assessment to provide a more meaningful evaluation of the course and updated in response to recent course assessment.

Proposed Start Semester: Winter 2020

Course Description: This course is an intensive study of the diversity, general biology, evolution, and environmental relationships of the major animal groups. Students study animals with an emphasis on comparative anatomy and physiology, taxonomy, evolution, behavior, and ecology. Lectures will incorporate interactive discussions and activities that address our current understanding of animal biology. Laboratory topics will focus on taxonomy and anatomy using models, live specimens, behavioral experiments, field work and dissection. This course will include a semester term paper based on formal observations at a zoological park.

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 **Student:** 45

Lab: Instructor: 45 **Student:** 45

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

Prerequisite

BIO 101 minimum grade "C"

General Education

MACRAO

MACRAO Science & Math

MACRAO Lab Science Course

General Education Area 4 - Natural Science

Assoc in Applied Sci - Area 4

Assoc in Science - Area 4

Assoc in Arts - Area 4

Michigan Transfer Agreement - MTA

MTA Lab Science

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Identify important anatomical structures within each major animal phyla.

Assessment 1

Assessment Tool: Outcome-related questions on the written final exam will be used, and an item analysis will be done for these questions for Outcome 1.

Assessment Date: Winter 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key to final exam

Standard of success to be used for this assessment: 70% of students will score a 70% or better on the outcome-related assessment questions.

Who will score and analyze the data: Departmental faculty

2. Specify the similarities and differences in physiological processes found within and across major animal phyla.

Assessment 1

Assessment Tool: Outcome-related questions on the written exam will be used, and an item analysis will be done for these questions for Outcome 2.

Assessment Date: Winter 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key to final exam

Standard of success to be used for this assessment: 70% of students will score a 70% or higher on the outcome-related assessment questions.

Who will score and analyze the data: Departmental faculty

3. Recognize the relationships and mechanisms involved in animal evolution and biodiversity.

Assessment 1

Assessment Tool: Outcome-related questions on the written final exam will be used, and an item analysis will be done for these questions for Outcome 3.

Assessment Date: Winter 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key to final exam

Standard of success to be used for this assessment: 70% of students will score a 70% or higher on the outcome-related assessment questions.

Who will score and analyze the data: Departmental faculty

4. Identify and describe the ecological relationships between animals and their environment.

Assessment 1

Assessment Tool: Outcome-related questions on the written final exam will be used, and an item analysis will be done for these questions for Outcome 4.

Assessment Date: Winter 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key to final exam

Standard of success to be used for this assessment: 70% of students will score a 70% or higher on the outcome-related assessment questions.

Who will score and analyze the data: Departmental faculty

Assessment 2

Assessment Tool: Term paper that focuses on the natural history, behavior and ecology of a specific animal species.

Assessment Date: Winter 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students will score a 70% or better on the final term paper.

Who will score and analyze the data: Departmental faculty

5. Demonstrate a working knowledge of animal specimen dissection, anatomy, and classification in a laboratory setting.

Assessment 1

Assessment Tool: Laboratory practical exam

Assessment Date: Winter 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key to exam

Standard of success to be used for this assessment: 70% of students will score a 70% or higher on the final lab practical exam.

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Compare and contrast the basic characteristics of the major animal phyla.
2. Compare and contrast the integumentary system in invertebrates and vertebrates.
3. List three fundamental kinds of movement and support systems, explain how they work, and give examples of each.
4. List the major properties of muscular tissue, and describe three kinds of muscle tissue in animals.
Describe the differences between arthropod and vertebrates muscles.
5. Define evolution, and discuss the historical perspective behind the theory.
6. Identify Lamarck's theory of acquired traits.
7. Compare and contrast natural selection, sexual selection, and artificial selection and how each relates to the theory of evolution.

8. List several lines of evidence for evolution and how they relate to different taxa.
9. Recognize how genetic mutation relates to gene frequency, gene pools, and evolution.
10. Indicate how evolutionary processes relate to animal diversity.
11. Define ecology.
12. Recognize how the environment impacts population size and dispersal.
13. List the different levels of organization in natural systems: species, populations, communities, ecosystems, and biosphere.
14. Compare and contrast the different relationships of organisms to each other: commensalism, mutualism, parasitism, predatory prey, and competition.
15. Identify the energetic relationships of organisms in relation to a food pyramid, a food chain, and a food web.
16. Describe how ecology affects species survival and behavior.
17. Identify the neurological events in a stimulus-response system.
18. Give examples of animal toxins (venom and poison) and how they work.
19. Compare and contrast the major kinds of nervous systems in invertebrates and vertebrates.
20. Define the following sensory receptors, and describe examples in invertebrates and vertebrates: baroreceptors, chemoreceptors, photoreceptors, tactile receptors, and thermoreceptors.
21. Identify the structure and functions of hormones in invertebrates and vertebrates.
22. List the sources and functions of vertebrate hormones other than those produced by the endocrine glands.
23. Identify invertebrate circulatory systems and the fluids found in each.
24. Identify the circulatory system of vertebrates and the components of blood.
25. Recognize different types of respiration in invertebrates and vertebrates.
26. Recognize respiratory exchange across membrane surfaces in aquatic vertebrates.
27. Identify the mechanisms for lung ventilation and the relevant process in amphibians, reptiles, and birds.
28. Define thermoregulation and temperature optima. Discuss different physiologies between ectothermic and endothermic animals.
29. Compare and contrast the different types of digestive systems and how they evolved in animals.
30. Identify various animal strategies for acquiring food.
31. Define six processes involved in mammalian nutrition.
32. Define sexual and asexual reproduction, and discuss the advantages and disadvantages of each.
33. List the four kinds of asexual reproduction and give examples of invertebrates in which each occurs.
34. Identify major strategies of sexual reproduction.
35. Compare reproductive strategies among the invertebrates and vertebrates.
36. Recognize the different taxonomic classes within each of the phyla studied in lab.
37. Describe the structure and function of each phyla's external and internal anatomy.
38. Compare and contrast anatomical systems and body organization to related phyla.
39. Describe the evolutionary significance of each phylum.
40. Describe the diversity of each phylum including habitat, feeding, reproduction, communication, behavior, and unique taxonomic traits.
41. Perform detailed dissections on representative specimens from major animal phyla.
42. Recognize the taxonomy, external anatomy, and internal anatomy of a zoological specimen in a laboratory setting.
43. Identify various animal structures and tissues using microscopes (light and dissecting) in a laboratory setting.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>David Wooten</i>	<i>Faculty Preparer</i>	<i>Aug 05, 2019</i>
Department Chair/Area Director: <i>Anne Heise</i>	<i>Recommend Approval</i>	<i>Aug 19, 2019</i>
Dean: <i>Victor Vega</i>	<i>Recommend Approval</i>	<i>Sep 17, 2019</i>
Curriculum Committee Chair: <i>Lisa Veasey</i>	<i>Recommend Approval</i>	<i>Sep 30, 2019</i>
Assessment Committee Chair: <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Oct 04, 2019</i>
Vice President for Instruction: <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Oct 07, 2019</i>

MASTER SYLLABUS

Course Discipline Code & No: BIO 227 Title: Biology of Animals Effective Term W07
 Division Code: MNBS Department Code: LIF Org #: 12100
 Don't publish: College Catalog Time Schedule Web Page

Reason for Submission. Check all that apply.
 New course approval Reactivation of inactive course
 Three-year syllabus review/Assessment report Inactivation (Submit this page only.)
 Course change

Change information: Note all changes that are being made. Form applies only to changes noted.
 Consultation with all departments affected by this course is required. Total Contact Hours (total contact hours were: _____)
 Course discipline code & number (was _____)* Distribution of contact hours (contact hours were: lecture: _____ lab _____ clinical _____ other _____)
 *Must submit inactivation form for previous course. Pre-requisite, co-requisite, or enrollment restrictions
 Course title (was _____) Change in Grading Method
 Course description Outcomes/Assessment
 Course objectives (minor changes) Objectives/Evaluation
 Credit hours (credits were: _____) Other _____

Rationale for course or course change. Attach course assessment report for existing courses that are being changed.

Approvals Department and divisional signatures indicate that all departments affected by the course have been consulted.

Department Review by Chairperson New resources needed All relevant departments consulted
 Print: William Nevers & Dave Wooten Signature: [Signature] Date: 12/06/06
 Faculty/Preparer
 Print: William B. Nevers Signature: [Signature] Date: _____
 Department Chair
 Division Review by Dean
 Request for conditional approval
 Recommendation Yes No M. Shuman 12/12/06
 Dean's/Administrator's Signature Date
 Curriculum Committee Review
 Recommendation Tabled Yes No [Signature] 1/18/07
 Curriculum Committee Chair's Signature Date
 Vice President for Instruction Approval [Signature] 1/19/07
 Vice President's Signature Date
 Approval Yes No Conditional

Do not write in shaded area.
 Log File 12/15/06 Ecopy Banner 1/25 C&A Database 1/25 C&A Log File 1/25 Basic skills Contact fee 200701

Please return completed form to the Office of Curriculum & Assessment and email an electronic copy to sjohn@wccnet.edu for posting on the website.

MASTER SYLLABUS

***Complete ALL sections which apply to the course, even if changes are not being made.**

Course: BIO 227	Course title: Biology of Animals
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Credit hours: 4 If variable credit, give range: _____ to _____ credits	Contact hours per semester: <table style="width:100%"> <tr> <td></td> <td style="text-align:center"><u>Student</u></td> <td style="text-align:center"><u>Instructor</u></td> </tr> <tr> <td>Lecture:</td> <td style="text-align:center">45</td> <td style="text-align:center">45</td> </tr> <tr> <td>Lab:</td> <td style="text-align:center">45</td> <td style="text-align:center">45</td> </tr> <tr> <td>Clinical:</td> <td style="text-align:center">_____</td> <td style="text-align:center">_____</td> </tr> <tr> <td>Practicum:</td> <td style="text-align:center">_____</td> <td style="text-align:center">_____</td> </tr> <tr> <td>Other:</td> <td style="text-align:center">_____</td> <td style="text-align:center">_____</td> </tr> <tr> <td>Totals:</td> <td style="text-align:center">90</td> <td style="text-align:center">90</td> </tr> </table>		<u>Student</u>	<u>Instructor</u>	Lecture:	45	45	Lab:	45	45	Clinical:	_____	_____	Practicum:	_____	_____	Other:	_____	_____	Totals:	90	90	Are lectures, labs, or clinicals offered as separate sections? <input type="checkbox"/> Yes - lectures, labs, or clinicals are offered in separate sections <input checked="" type="checkbox"/> No - lectures, labs, or clinicals are offered in the same section	Grading options: <input type="checkbox"/> P/NP (limited to clinical & practica) <input type="checkbox"/> S/U (for courses numbered below 100) <input checked="" type="checkbox"/> Letter grades
	<u>Student</u>	<u>Instructor</u>																						
Lecture:	45	45																						
Lab:	45	45																						
Clinical:	_____	_____																						
Practicum:	_____	_____																						
Other:	_____	_____																						
Totals:	90	90																						

Prerequisites. Select one:

- College-level Reading & Writing
 Reduced Reading/Writing Scores (Add information at Level I prerequisite)
 No Basic Skills Prerequisite (College-level Reading and Writing is not required.)

In addition to Basic Skills in Reading/Writing:

Level I (enforced in Banner)

Course	Grade	Test	Min. Score	Concurrent Enrollment <small>(Can be taken together)</small>	Corequisites <small>(Must be enrolled in this class also during the same semester)</small>
BIO 101	C	_____	_____	<input type="checkbox"/>	_____
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____	<input type="checkbox"/>	_____
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____	<input type="checkbox"/>	_____
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____	<input type="checkbox"/>	_____

Level II (enforced by instructor on first day of class)

Course	Grade	Test	Min. Score
Consent of Instructor	_____	_____	_____
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____

Enrollment restrictions (In addition to prerequisites, if applicable.)

- and or Consent required
 and or Admission to program required
 and or Other (please specify): _____
 Program: _____

Please send syllabus for transfer evaluation to:

Conditionally approved courses are not sent for evaluation.
 Insert course number and title you wish the course to transfer as.

- | | |
|--|---|
| <input type="checkbox"/> E.M.U. as _____ | <input type="checkbox"/> _____ as _____ |
| <input type="checkbox"/> U of M as _____ | <input type="checkbox"/> _____ as _____ |
| <input type="checkbox"/> _____ as _____ | <input type="checkbox"/> _____ as _____ |

MASTER SYLLABUS

<p>Course BIO 227</p>	<p>Course title Biology of Animals</p>	
<p>Course description State the purpose and content of the course. Please limit to 500 characters.</p>	<p>This course is an intensive study of the diversity, evolutionary and environmental relationships, structures and functions of the major animal groups. Animals are studied with an emphasis on comparative anatomy and physiology, behavior, and ecology. Lectures will incorporate interactive discussions and activities that address our current understanding of animal biology. Laboratory topics will focus on taxonomy and anatomy using models, live specimens, behavioral experiments and dissection.</p>	
<p>Course outcomes List skills and knowledge students will have after taking the course.</p> <p>Assessment method Indicate how student achievement in each outcome will be assessed to determine student achievement for purposes of course improvement.</p>	<p>Outcomes (applicable in all sections)</p> <ol style="list-style-type: none"> 1. Recognize the similarities and differences in form throughout the animal kingdom. 2. Identify basic similarities and differences in physiological processes throughout the animal kingdom. 3. Recognize the relationships between evolution and biodiversity throughout the animal kingdom. 4. Identify the relationships between animals and their environment. 	<p>Assessment Methods for determining course effectiveness</p> <p>Four core questions on the lecture/lab final exam will be used and an item analysis will be done for these questions for outcome 1.</p> <p>Four core questions on the lecture/lab final exam will be used and an item analysis will be done for these questions for outcome 2.</p> <p>Four core questions will be used on the lecture/lab final exam and an item analysis will be done on these questions for outcome 3.</p> <p>Four core questions will be used on the lecture/lab final exam and an item analysis will be done on these questions for outcome 4.</p>
<p>Course Objectives Indicate the objectives that support the course outcomes given above.</p> <p>Course Evaluations Indicate how instructors will determine the degree to which each objective is met for each student.</p>	<p>Objectives (applicable in all sections)</p> <p>Introduction to major phyla. Protection, Support and Movement (Outcome 1)</p> <ol style="list-style-type: none"> 1. Compare and contrast the basic characteristics of the major animal phyla 2. Compare and contrast the integumentary system in invertebrates and in each of the main groups of vertebrates 3. List three fundamental kinds of movement and support systems; explain how they work, and give examples of each 4. List the major properties of muscular tissue and describe three kinds of muscle tissue in animals; describe the differences between arthropod and vertebrate muscles. <p>Evolution and Natural Selection (Outcome 3)</p>	<p>Evaluation Methods for determining level of student performance of objectives</p> <p>Responses to specific questions on the lecture/lab final exam.</p>

	<p>5. Define evolution and discuss the historical perspective behind the theory.</p> <p>6. Identify Lamarck's Theory of Acquired traits.</p> <p>7. Compare and contrast natural selection, sexual selection, and artificial selection and how each relates to the Theory of Evolution.</p> <p>8. List several lines of evidence for evolution and how they relate to different taxa.</p> <p>9. Recognize how genetic mutation relates to gene frequency, gene pools, and evolution.</p> <p>10. Indicate how evolutionary processes relate to animal diversity.</p> <p>Ecology (Outcome 4)</p> <p>11. Define ecology</p> <p>12. Recognize how the environment impacts population size and dispersal.</p> <p>13. List the different levels of organization in natural systems: species, populations, communities, ecosystems, biosphere.</p> <p>14. Compare and contrast the different relationships of organisms to each other; commensalism, mutualism, parasitism, predator prey, competition.</p> <p>15. Identify the energetic relationships of organisms in relation to a food pyramid, a food chain, and a food web.</p> <p>16. Describe how ecology has an effect on species survival and behavior.</p> <p>Communication (Outcome 2)</p> <p>17. Identify the neurological events in a stimulus-response system</p> <p>18. Give examples of neurotoxins, where they are found and how they work.</p> <p>19. Compare and contrast the major kinds of nervous systems in invertebrates and vertebrates.</p> <p>20. Define the following sensory receptors and describe examples in invertebrates and vertebrates; baroreceptors, chemoreceptors, georeceptors, photoreceptors, tactile receptors, and thermoreceptors.</p> <p>21. Recognize how the environmental medium affects sensory stimuli and reception.</p> <p>Physiological ecology (Outcome 2)</p> <p>22. Identify the structure and functions of hormones in invertebrates and vertebrates.</p> <p>23. List the sources and functions of vertebrate hormones other than those produced by the endocrine glands.</p> <p>24. Identify how the circulatory system evolved in invertebrates and invertebrates.</p>	
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	<p>25. Identify invertebrate circulatory systems and the fluids found in each.</p> <p>26. Identify the circulatory system of vertebrates and the components of blood.</p> <p>27. Recognize the five different types of respiration in invertebrates.</p> <p>28. Recognize respiratory exchange across membrane surfaces in aquatic vertebrates</p> <p>29. Define external respiration and discuss four physiological principles on which it is based in air breathing animals.</p> <p>30. Identify the mechanisms for lung ventilation and and the relevant process in amphibians, reptiles, and birds.</p> <p>31. Recognize the diving reflex in whales, including the roles of oxygen debt and bradycardia.</p> <p>32. Compare and contrast the respiratory systems of aquatic and terrestrial vertebrates.</p> <p>33. Define thermoregulation and temperature optima; discuss the four processes of heat exchange with the environment.</p> <p>34. Compare thermoregulation in invertebrates, fish, amphibians, reptiles and birds.</p> <p>Nutrition and Digestion (Outcome 2)</p> <p>35 Define nutrition in relationship to the major biological molecules and their significance in cellular physiology.</p> <p>36. Compare and contrast the different types of digestive systems and how they evolved in animals.</p> <p>37. Identify various animal strategies for acquiring food.</p> <p>38 Define six processes involved in mammalian nutrition.</p> <p>Reproduction and Development (Outcome 2)</p> <p>39. Define sexual and asexual reproduction and discuss the advantages and disadvantages of each.</p> <p>40. List the four kinds of asexual reproduction and give examples of invertebrates in which each occurs.</p> <p>41 Identify major strategies of sexual reproduction.</p> <p>42. Compare reproductive strategies among the invertebrates and vertebrates.</p> <p>Laboratory Outcomes 1-4)</p> <p>43. Recognize the different taxonomic classes within each of the phyla studied in lab.</p> <p>44 Describe the structure and function of each phyla external and internal anatomy.</p> <p>45. Compare and contrast anatomical systems and body organization to related phyla.</p> <p>46. Describe the evolutionary significance of each</p>	
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	phylum. 47. Describe the diversity of each phylum including habitat, feeding, reproduction, communication, behavior, and unique taxonomic traits.	
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List all new resources needed for course, including library materials.

Student Materials:

List examples of types Texts Supplemental reading Supplies Uniforms Equipment Tools Software	Text Book Lab Manual	Estimated costs \$
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Equipment/Facilities: Check all that apply. (All classrooms have overhead projectors and permanent screens.)
 Check level only if the specified equipment is needed for all sections of a course.

<input type="checkbox"/> Level I classroom Permanent screen & overhead projector <input type="checkbox"/> Level II classroom Level I equipment plus TV/VCR <input checked="" type="checkbox"/> Level III classroom Level II equipment plus data projector, computer, faculty workstation	<input checked="" type="checkbox"/> Off-Campus Sites <input checked="" type="checkbox"/> Testing Center <input checked="" type="checkbox"/> Computer workstations/lab <input type="checkbox"/> ITV <input type="checkbox"/> TV/VCR <input type="checkbox"/> Data projector/computer <input type="checkbox"/> Other _____
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Assessment plan:

Learning outcomes to be assessed (list from Page 3)	Assessment tool	When assessment will take place	Course section(s)/other population	Number students to be assessed
1. Recognize the similarities and differences in form throughout the animal kingdom.	Four core questions for each outcome will be used on the final exams (lecture / lab)	Once every three years starting W 08.	All sections	70% (randomly selected).

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<p>2. Identify basic similarities and differences in physiological processes throughout the animal kingdom.</p> <p>3. Recognize the relationship between evolution and biodiversity throughout the animal kingdom.</p> <p>4. Identify the relationship between animals and their environment.</p>				

Scoring and analysis of assessment:

1. Indicate how the above assessment(s) will be scored and evaluated (e.g. departmentally developed rubric, external evaluation, other). Attach the rubric.
Course instructor will do an item analysis of the 16 core questions on the final exam, and these will be evaluated by the department.
2. Indicate the standard of success to be used for this assessment.
70% of students with the correct answer per question.
3. Indicate who will score and analyze the data.
Individual instructors will do blind scoring of their own sections and return the data to the department.
4. Explain the process for using assessment data to improve the course.
After data has been analyzed, the department will review the data to determine whether changes should be made to the core questions or if more emphasis should be placed on sections of material that students did not score well on.