|  |  |
| --- | --- |
| |  | | --- | | NORTH CENTRAL TEXAS COLLEGE  COURSE SYLLABUS | |

|  |  |  |
| --- | --- | --- |
| Course Title: **Environmental Biology** | | |
| Course Prefix & Number: **BIOL 2406** | Section Number:  **700,760** | Semester: **Spring 2017** |
| Semester Credit Hours: **4** | Lecture Hours: **48** | Lab Hours: **32** |
| Principles of environmental systems and ecology, including biogeochemical cycles, energy transformations, abiotic interactions, symbiotic relationships, natural resources and their management, lifestyle analysis, evolutionary trends, hazards and risks, and approaches to ecological research.  This laboratory-based course accompanies Biology 2306, Environmental Biology. Laboratory activities will reinforce principles of environmental systems and ecology, including biogeochemical cycles, energy transformations, abiotic interactions, symbiotic relationships, natural resources and their management, lifestyle analysis, evolutionary trends, hazards and risks, and approaches to ecological research. | | |
| Course Prerequisite(s): None | | |
| Required or Recommended Course Materials:  Cunningham, W. P., & Cunningham, (2016). Principles of Environmental Science: Inquiry and Application 9th ed.). New York: McGraw Hill. | | |

**INSTRUCTOR INFORMATION**

|  |  |
| --- | --- |
| Name of Instructor: | Belinda H. Anderson |
| Campus/Office Location: | Bowie Campus Room 132 |
| Telephone Number: | 940-872-4002 ext. 5217 |
| E-mail Address: | banderson@nctc.edu |
| Office Hours: | Monday12:30-3Wednesday 10:30-3 or online H10-12 |

**GRADING CRITERIA**

|  |  |
| --- | --- |
| **Graded Course Elements** | **Point Values** |
| Exams 3@ 150 points each | 450 points |
| Lab Grades | 250 Points |
| Projects | 300 Points |
|  |  |
| **TOTAL** | **1000 Points** |

**STUDENT LEARNING OUTCOMES**

|  |  |
| --- | --- |
|  | At the successful completion of this course the student will be able to: |
| LECTURE LEARNING OUTCOMES | |
| 1. | Explain the structure and impact of biogeochemical cycles. |
| 2. | Describe energy transformations across trophic levels. |
| 3 | Illustrate abiotic/biotic interactions and symbiotic relationships. |
| 4. | Identify various types of natural resources, human impact on these resources, and common resource management practices. |
| 5. | Quantify and analyze the impact of lifestyle on the environment. |
| 6. | Depict evolutionary trends and adaptations to environmental changes. |
| 7. | Describe environmental hazards and risks and the social and economic ramifications. |
| 8 | Describe ecological and statistical techniques and approaches used in the study of environmental biology. |
| LABORATORY LEARNING OUTCOMES | |
| 1. | Apply scientific reasoning to investigate questions and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data. |
| 2. | Use critical thinking and scientific problem solving to make informed decisions in the laboratory. |
| 3. | Communicate effectively the results of scientific investigations. |
| 4. | Explain the structure and impact of biogeochemical cycles. |
| 5. | Describe energy transformations across trophic levels. |
| 6. | Illustrate abiotic/biotic interactions and symbiotic relationships. |
| 7. | Identify various types of natural resources, human impact on these resources, and common resource management practices. |
| 8. | Quantify and analyze the impact of lifestyle on the environment. |
| 9. | Depict evolutionary trends and adaptations to environmental changes. |
| 10. | Describe environmental hazards and risks and the social and economic ramifications. |
| 11. | Describe ecological and statistical techniques and approaches used in the study of environmental biology. |

**ATTENDANCE POLICY**

Absences exceeding 9 contact hours of lecture and or laboratory of BIOL 2406 may result in student being dropped from the course. It shall be at the discretion of the instructor to drop students who are absent in excess of 9 contact hours.

**TENTATIVE SCHEDULE**

Last day to withdraw from a course with a “W” is April 6, 2017

Spring Break is March 13-18, 2017

|  |  |  |
| --- | --- | --- |
| **Date** | **Topic** | **Chapter** |
| 1/1761/20 | Introduction and General Overview | 1 |
| 1/23-1/27 | Environmental Systems | 2 |
| 1/30-2/3 | Evolution, Species Interactions, Biological Communities | 3 |
| 2/6-2/10 | Human Population | 4 |
| 2/13-2/17 | Biomes and Biodiversity | 5 |
| 2/20-2/24 | **EXAM 1**  Conservation/ slum tourism | 6 |
| 2/27-3/3 | Conservation/ slum tourism | 6 continued |
| 3/6-3/10 | Food and Agriculture | 7 |
| 3/13-3/17 | SPRING BREAK |  |
| 3/20-3/24 | Health and Toxicology | 8 |
| 3/27-3/31 | Climate and Air Pollution | 9, 10 |
| 4/3-4/7 | Water | 11 |
| 4/10-4/14 | Geology and Energy, **Exam 2** | 12 |
| 4/17-4/21 | Solid Waste | 13 |
| 4/24-4/28 | Economics and Urbanization | 14 |
| 5/1-5/5 | Policy and Sustainability, **Exam 3** | 15,16 |
| 5/8-5/12 | **FINAL EXAM WEEK** |  |

|  |
| --- |
| - No student’s grades will be discussed with any individual other than the student. Grades will not be given out over the phone or e-mailed.  -Instructor must approve visitors and guests before class.  -**CELLULAR PHONE USE IS NOT ALLOWED.**  -Inappropriate classroom behavior will not be tolerated. It is assumed that adults in a collegiate environment will act accordingly. The instructor retains the right to drop students who display inappropriate behavior.  -Makeup work and exams **may** be given at the discretion of the instructor.  -Scholastic dishonesty shall constitute a violation of college rules and regulations and is punishable as prescribed by Board policies. Scholastic dishonesty shall include, but not be limited to cheating on a test, plagiarism, and collusion. See the Student Handbook for more information. |

**DISABILITY SERVICES (OSD)**

The Office for Students with Disabilities (OSD) provides accommodations for students who have a documented disability. On the Corinth Campus, go to room 170 or call 940-498-6207. On the Gainesville Campus, go to room 110 or call 940-668-4209.  Students on the Bowie, Graham, Flower Mound, and online campuses should call 940-668-4209.

North Central Texas College is on record as being committed to both the spirit and letter of federal equal opportunity legislation, including the Americans with Disabilities Act (ADA) of 1990, ADA Amendments Act of 2009, and Section 504 of the Rehabilitation Act of 1973 (P.L. 93-112). <http://www.nctc.edu/StudentServices/SupportServices/Disabilityservices.aspx>

**CORE CURRICULUM FOUNDATIONAL COMPONENT AREA**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Communication

 Mathematics

X Life and Physical Science

 Language, Philosophy & Culture

 Creative Arts

 American History

 Government/Political Science

 Social and Behavioral Sciences

 Component Area Option

**REQUIRED CORE OBJECTIVES**

x Critical Thinking

 Communication

 Empirical and Quantitative

 Teamwork

x Personal Responsibility

x Social Responsibility

**COURSE TYPE**

 Academic General Education Course (from ACGM but not in NCTC Core)

XAcademic NCTC Core Curriculum Course

**** WECM Course

**STUDENT HANDBOOK**

Students are expected to follow all rules and regulations found in the student handbook. http://nctc.smartcatalogiq.com/en/2016-2017/Catalog/North-Central-Texas-College-Student-Handbook

|  |  |
| --- | --- |
| Name of Chair/Coordinator: | Doug Elrod, Ph.D. |
| Office Location: | Corinth Campus 351 |
| Telephone Number: | (940) 498-6291 |
| E-mail Address: | daelrod@nctc.edu |

**Bowie Project and Lab Information**

**Project List Due Date Possible Points**

- Photo Ops (10 good/10 bad) 02/27 100

-Environmental Current Event Folder 04/24 100

- Wildflower Photo Collection (20 specimens) 05/01 100

**Photo Ops**

-The Photo Ops should include pictures of 10 “good” environmental practices and 10 “bad” environmental practices. Include a description with each picture detailing why the practice is good or bad for the environment. The 10 “bad” pictures should also include solutions to mitigate the bad situation. The pictures should **NOT** come from the internet, magazines etc. but should be pictures of environmental practices that you have seen taking place in “your own” environment. The photo ops should be placed in a folder. The project will be graded as follows:

|  |  |
| --- | --- |
| Possible  Points | Section |
| 5 | Arial or Times Roman 12 font or less with ½” or .5” margins all around |
| 5 | Spelling and grammar must be correct |
| 30 | Positive observations and summary of each observation |
| 30 | Negative observations and summary of each observation |
| 30 | Mitigations for negative observations |
|  | **TOTAL POINTS 100** |

**Wildflower Photo Collection**

-The Wildflower Photo collection should include pictures of 20 **native Texas** wildflowers. Each flower

represented should have 2 pictures: 1) the whole plant in bloom and 2) a close up that clearly shows the bloom and leaves.

-Each flower represented should include the following description plate; scientific name (genus/species), common name, collection site, time of year, time of day collected, ambient temperature and site conditions.

|  |  |
| --- | --- |
| Scientific Name |  |
| Common Name |  |
| Collection Site |  |
| Time of Year |  |
| Time of Day Collected |  |
| Ambient Temperature |  |
| Site Conditions |  |

-Must be typed

-A folder should be used.

-Reference books for identification can be found in the library. Final identification results will be based on the reference manual: *Illustrated Flora of North Central Texas by Shinners and Mahlers*

-The project will be graded as follows:

|  |  |
| --- | --- |
| Possible  Points | Section |
| 20 | Inclusion of 20 **native Texas wildflowers** |
| 60 | Proper identification |
| 20 | Proper use of description plate |
|  | **TOTAL POINTS 100** |

**Environmental Current Event Folder**

A folder of environmental current events will be kept throughout the semester. Your folder is to contain 1) your dated

( within 2 weeks of the class date for the topic) current event reference information with title, 2) a one page abstract of the information contained from each of 12 environmental current events, 3) follow the format on the next page. Do not include the actual article in the folder. Your current events should come from reputable journals, newspapers, magazines or internet sources and reflect the information we are covering each week. You may not use **Wikipedia**. Your articles should include 2 international/global, 2 national (can include Texas) and 2 local (50 mile radius of NCTC) events. The balance can come from your pick of global, national or local events. The reports should be put in the bracts in a 3 bract **paper** pocket folder. You may use a neat **used** folder. I also have **some** used folders you may have. The folders are due **April 24** at the beginning of class. No late folders will be accepted. Every effort will be made to spend part of class time each Monday discussing your current events. Students will be randomly selected each week to share their current event with class discussion to follow. The folder project is worth a total of 100 points out of the class/lab total of 1000 points. You will be graded on participation in discussion, neatness and completeness of your folder, attention to detail and following directions. It is **required** that you **type** your current event information, including the abstract. An abstract is a brief synopsis of the information contained in the article. The following is a schedule of the topics we will cover each week that should be reflected in your current events folder.

01/23 None Due

01/30 Ecological niches, Species interactions, Keystone species

02/06 Human populations

02/13 Biomes, Biodiversity, invasive species

02/20 You Pick

02/27 Debt for nature swaps, National forests, parks and grasslands, ecotourism

03/06 Famine, erosion, Genetically Modified Organisms (GMO), green revolution, sustainable agriculture

03/20 Environmental Health, Zoonotic diseases

03/27 Climate change, air pollution

04/03 Water resources

04/10 Geologic hazards

04/17 Energy, light pollution

04/24 Solid waste, hazardous waste, slum tourism

**The current event folder will be graded as follows:**

-Participation in class discussion 10 points

-Cover page 5 points

-Name and Class on folder 5 points

-Typed 5 points

-Collectively: 6.25 points for each of 12 topics

Date 1.25 points

Abstract 1.25 points

Format 1.25points

Location 1.25points

Neatness 1.25points

Total Points: 100

**Instructions for Current Events Folder**

Name and class period on front of folder

**Page 1** Cover Page (include name and class period)

**Page 2**… Current Event Abstract Pages for each of the 12 current events as follows:

1. Student Name: Belinda H. Anderson

Date Due: 01/30/17

Topic: Species Interaction

Title: “Freshwater Fish in N. America in Peril, Study Says” by Seth Lee

Source: The Mercury News ([www.mercurynews.com](http://www.mercurynews.com)) Vol. 3, Page 23

Date of Article: 01/15/17

Location: National

Abstract:

In the article “Freshwater Fish in N. America in Peril, Study says,” scientists spoke of the current issues involving freshwater fish in North America…. The abstract should be a brief synopsis of the information contained in the article. I should be able to read the abstract and have a good knowledge of what the article is about without having to look up the article. **Do not include the actual article in your folder!!**

1. Student Name: Belinda H. Anderson

Date Due: 02/06/17

Topic: Human Populations

# Title: Epigenetic changes promote development of fatty liver n mouse and human

Source: https://www.sciencedaily.com/releases/2017/01/170109102447.htm

Date of Article: 01/09/17

Location: National

Abstract:

Mice with a strong tendency to obesity already exhibit epigenetic changes at six weeks of age, inducing the liver to amplify its production of the enzyme DPP4 and release it into the circulation. Over the long term, this favors the development of a fatty liver. Such changes in DNA methylation are also detectable in humans with fatty liver and suggest a similar causal chain**. I copied this from the site…you are to write your own summary!!**

Biol 2406 Bowie

**Environmental Science Lab Syllabus**

Your lab grade will be worth 250 points out of the 1000 total points for the class. Participation is **very** important.

Participation papers 50 pts.

Stream Survey Report 75 pts.

Vermiculture Report 75 pts.

Bowie Elementary Presentation 50 pts

The following is a very tentative schedule and will be modified throughout the semester.

1/25 Microscope Usage

2/01 Vermiculture (Worm Bin setup)

2/08 Ecological Footprints/ Start Potatoes

2/15 Stream Survey (old clothes/shoes required)

2/22 National Park Contest

3/01 Wildflower Collection Techniques

3/08 How We Eat/ Potato Progress

3/22 Work on Bowie Elementary Presentations

3/29 Water/Sewage Treatment Plant Tour

4/05 Stream Survey/water sampling (old clothes/shoes required)

4/12 Owl Pellet Study

4/19 Light Pollution/ Stream Survey Report due

4/26 Harvest Worms/ Potato harvest

5/03 Vermiculture Report due

**Bowie Elementary Presentation** will consist of:

* A 20 to 30 minute presentation made to Bowie Elementary 2nd graders on an environmental topic picked by the 2nd grade teachers. You will be given criteria you must include in your presentation. You will be graded on proper inclusion of the criteria, enthusiasm, age appropriateness, representation of NCTC and use of visual aids. The presentation will be on a Monday afternoon between 12:30 and 2:30. Since this is not during a regularly scheduled class period for us you will need to check your schedule as to your availability. If you have a conflict please get with me as soon as possible for an alternative project.

**Participation papers** will consist of:

* A typed summary (no more than 1 page) of each of the following labs will be due the class period following the lab (each is worth up to 10 points):

Ecological Footprints, National Park study, How We Eat, Owl Pellet study and Water/ Sewage Treatment Plant tour.

**Stream Survey and Vermiculture Reports** should consist of:

-Abstract (brief synopsis of the overall project) (15pts)

- Introduction (introduces the topic/ why you did the project/why the topic is pertinent to environmental science) (10pts)

-Materials and Methods (explains how you did the project) (15pts)

-Results (explains what you found out) (15pts)

-Conclusion (your interpretation of the results) (15pts)

-Data tables/graphs/spreadsheets/pie charts etc. to back up your results (5pts)

Length is not important—Quality is! The reports will be graded on attention to details and accuracy of the data that you kept. If anyone could pick up your report, read it and understand the complete project you will have done your job. **The use of references in your introduction and conclusion are required.**

**Graham Project and Lab Information**

**Project List Due Date Possible Points**

- Photo Ops (10 good/10 bad) 02/28 100

-Environmental Current Event Folder 04/25 100

- Wildflower Photo Collection (20 specimens) 05/02 100

**Photo Ops**

-The Photo Ops should include pictures of 10 “good” environmental practices and 10 “bad” environmental practices. Include a description with each picture detailing why the practice is good or bad for the environment. The 10 “bad” pictures should also include solutions to mitigate the bad situation. The pictures should **NOT** come from the internet, magazines etc. but should be pictures of environmental practices that you have seen taking place in “your own” environment. The photo ops should be placed in a folder. The project will be graded as follows:

|  |  |
| --- | --- |
| Possible  Points | Section |
| 5 | Arial or Times Roman 12 font or less with ½” or .5” margins all around |
| 5 | Spelling and grammar must be correct |
| 30 | Positive observations and summary of each observation |
| 30 | Negative observations and summary of each observation |
| 30 | Mitigations for negative observations |
|  | **TOTAL POINTS 100** |

**Wildflower Photo Collection**

-The Wildflower Photo collection should include pictures of 20 **native Texas** wildflowers. Each flower

represented should have 2 pictures: 1) the whole plant in bloom and 2) a close up that clearly shows the bloom and leaves.

-Each flower represented should include the following description plate; scientific name (genus/species), common name, collection site, time of year, time of day collected, ambient temperature and site conditions.

|  |  |
| --- | --- |
| Scientific Name |  |
| Common Name |  |
| Collection Site |  |
| Time of Year |  |
| Time of Day Collected |  |
| Ambient Temperature |  |
| Site Conditions |  |

-Must be typed

-A folder should be used.

-Reference books for identification can be found in the library. Final identification results will be based on the reference manual: *Illustrated Flora of North Central Texas by Shinners and Mahlers*

-The project will be graded as follows:

|  |  |
| --- | --- |
| Possible  Points | Section |
| 20 | Inclusion of 20 **native Texas wildflowers** |
| 60 | Proper identification |
| 20 | Proper use of description plate |
|  | **TOTAL POINTS 100** |

**Environmental Current Event Folder**

A folder of environmental current events will be kept throughout the semester. Your folder is to contain 1) your dated

( within 2 weeks of the class date for the topic) current event reference information with title, 2) a one page abstract of the information contained from each of 12 environmental current events, 3) follow the format on the next page. Do not include the actual article in the folder. Your current events should come from reputable journals, newspapers, magazines or internet sources and reflect the information we are covering each week. You may not use **Wikipedia**. Your articles should include 2 international/global, 2 national (can include Texas) and 2 local (50 mile radius of NCTC) events. The balance can come from your pick of global, national or local events. The reports should be put in the bracts in a 3 bract **paper** pocket folder. You may use a neat **used** folder. The folders are due **April 25** at the beginning of class. No late folders will be accepted. Every effort will be made to spend part of class time each Tuesday discussing your current events. Students will be randomly selected each week to share their current event with class discussion to follow. The folder project is worth a total of 100 points out of the class/lab total of 1000 points. You will be graded on participation in discussion, neatness and completeness of your folder, attention to detail and following directions. It is **required** that you **type** your current event information, including the abstract. An abstract is a brief synopsis of the information contained in the article. The following is a schedule of the topics we will cover each week that should be reflected in your current events folder.

01/24 None Due

01/31 Ecological niches, Species interactions, Keystone species

02/07 Human populations

02/14 Biomes, Biodiversity, invasive species

02/21 You Pick

02/28 Debt for nature swaps, National forests, parks and grasslands, ecotourism

03/07 Famine, erosion, Genetically Modified Organisms (GMO), green revolution, sustainable agriculture

03/21 Environmental Health, Zoonotic diseases

03/28 Climate change, air pollution

04/04 Water resources

04/11 Geologic hazards

04/18 Energy, light pollution

04/25 Solid waste, hazardous waste, slum tourism

**The current event folder will be graded as follows:**

-Participation in class discussion 10 points

-Cover page 5 points

-Name and Class on folder 5 points

-Typed 5 points

-Collectively: 6.25 points for each of 12 topics

Date 1.25 points

Abstract 1.25 points

Format 1.25points

Location 1.25points

Neatness 1.25points

Total Points: 100

**Instructions for Current Events Folder**

Name and class period on front of folder

**Page 1** Cover Page (include name and class period)

**Page 2**… Current Event Abstract Pages for each of the 12 current events as follows:

1. Student Name: Belinda H. Anderson

Date Due: 01/31/17

Topic: Species Interaction

Title: “Freshwater Fish in N. America in Peril, Study Says” by Seth Lee

Source: The Mercury News ([www.mercurynews.com](http://www.mercurynews.com)) Vol. 3, Page 23

Date of Article: 01/15/17

Location: National

Abstract:

In the article “Freshwater Fish in N. America in Peril, Study says,” scientists spoke of the current issues involving freshwater fish in North America…. The abstract should be a brief synopsis of the information contained in the article. I should be able to read the abstract and have a good knowledge of what the article is about without having to look up the article. **Do not include the actual article in your folder!!**

1. Student Name: Belinda H. Anderson

Date Due: 02/07/17

Topic: Human Populations

# Title: Epigenetic changes promote development of fatty liver in mouse and human

Source: https://www.sciencedaily.com/releases/2017/01/170109102447.htm

Date of Article: 01/09/17

Location: National

Abstract:

Mice with a strong tendency to obesity already exhibit epigenetic changes at six weeks of age, inducing the liver to amplify its production of the enzyme DPP4 and release it into the circulation. Over the long term, this favors the development of a fatty liver. Such changes in DNA methylation are also detectable in humans with fatty liver and suggest a similar causal chain**. I copied this from the site…you are to write your own summary!!**

**Biol 2406 Graham**

**Environmental Science Lab Syllabus**

Your lab grade will be worth 250 points out of the 1000 total points for the class. Participation is **very** important.

Participation papers 30 pts.

Group Presentation 100 pts.

Vermiculture Report 75 pts.

Crestview Elementary Presentation 45 pts

The following is a very tentative schedule and will be modified throughout the semester.

1/24 Microscope Usage

1/31 Vermiculture (Worm Bin setup)

2/07 **Ecological Footprints**/ Start Potatoes

2/14 Owl Pellet Study

2/21 National Park Contest

2/28 Wildflower Collection Techniques

3/07 **How We Eat**

Spring Break

3/21 Work on Crestview Elementary and Group Presentations

3/28 **Water/Sewage Treatment Plant Tour**

4/04 Crestview Elementary Presentations

4/11 Light Pollution Study

4/18 Group Presentations

4/25 Harvest Worms/ Potato harvest

5/02 Vermiculture Report due

**Crestview Elementary Presentation** will consist of:

* A 20 to 30 minute presentation made to Crestview Elementary 2nd graders on an environmental topic picked by the 2nd grade teachers. You will be given criteria you must include in your presentation. You will be graded on proper inclusion of the criteria, enthusiasm, age appropriateness, representation of NCTC and use of visual aids.

**Participation papers** will consist of:

* A typed summary (no more than 1 page) of each of the following labs will be due the class period following the lab (each is worth up to 10 points):

Ecological Footprints, How We Eat and Water/ Sewage Treatment Plant tour.

**Vermiculture Report** should consist of:

-Abstract (brief synopsis of the overall project) (15pts)

- Introduction (introduces the topic/ why you did the project/why the topic is pertinent to environmental science) (10pts)

-Materials and Methods (explains how you did the project) (15pts)

-Results (explains what you found out) (15pts)

-Conclusion (your interpretation of the results) (15pts)

-Data tables/graphs/spreadsheets/pie charts etc. to back up your results (5pts)

Length is not important—Quality is! The reports will be graded on attention to details and accuracy of the data that you kept. If anyone could pick up your report, read it and understand the complete project you will have done your job. **The use of references in your introduction and conclusion are required.**