

Revised 2-Trial 10/11/2016

FORMAT 1

Submit original with signatures + 1 copy + electronic copy to Faculty Senate (Box 7500).  
See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

**TRIAL COURSE OR NEW COURSE PROPOSAL**  
(Attach copy of syllabus)

**SUBMITTED BY:**

Department	<b>GPMSL</b>	College/School	<b>SFOS</b>
Prepared by	<b>Amanda L. Kelley</b>	Phone	<b>(907) 474-2474</b>
Email Contact	<b>alkelley@alaska.edu</b>	Faculty Contact	<b>Amanda Kelley</b>

1. ACTION DESIRED (CHECK ONE):

Trial Course	<input checked="" type="checkbox"/>	New Course	<input type="checkbox"/>
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2. COURSE IDENTIFICATION:

Dept	<b>MSL</b>	Course #	<b>394</b>	No. of Credits	<b>3</b>
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Justify upper/lower division status & number of credits:

This is an upper division course that will build on knowledge gained from lower division courses (listed as prerequisites- MSL 211 and 212 or BIOL 115 and 116). Students will be required to read peer-review research articles, synthesize information and write a report about a chosen topic. Students will also be required to give a presentation on a chosen topic.

3. PROPOSED COURSE TITLE: **Human Impacts to the Marine Biosphere**

4. To be CROSS LISTED? YES/NO

<b>No</b>	If yes, Dept:	Course #
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NOTE: Cross-listing requires approval of both departments and deans involved. Add lines at end of form for additional required signatures.

5. To be STACKED?\* YES/NO

<b>NO</b>	If yes, Dept.	Course #
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How will the two course levels differ from each other? How will each be taught at the appropriate level?:

\* Use only one Format 1 form for the stacked course (not one for each level of the course!) and attach syllabi. Stacked course applications are reviewed by the (Undergraduate) Curricular Review Committee and by the Graduate Academic and Advising Committee. Creating two different syllabi (undergraduate and graduate versions) will help emphasize the different qualities of what are supposed to be two different courses. The committees will determine: 1) whether the two versions are sufficiently different (i.e. is there undergraduate and graduate level content being offered); 2) are undergraduates being overtaxed?; 3) are graduate students being undertaxed? In this context, the committees are looking out for the interests of the students taking the course. Typically, if either committee has qualms, they both do. More info online - see URL at top of this page.

6. FREQUENCY OF OFFERING: **Trial Course**

Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) - or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (Effective AY2015-16 if approved by 3/31/2015; otherwise AY2016-17)

**Spring 2018**

**8. COURSE FORMAT:**

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the Core Review Committee.

COURSE FORMAT: (check all that apply)

<input type="checkbox"/>	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input checked="" type="checkbox"/>	6 weeks to full semester
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OTHER FORMAT (specify)

Mode of delivery (specify lecture, field trips, labs, etc)

**Lecture, in class hands on activities, small groups, presentations, trips around campus, ie, microscopy center, my laboratory, OARC**

9. CONTACT HOURS PER WEEK:	<input type="text" value="3"/>	LECTURE hours/weeks	<input type="text"/>	LAB hours /week	<input type="text"/>	PRACTICUM hours /week	<input type="text"/>
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Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/guidelines-for-computing-/> for more information on number of credits.

OTHER HOURS (specify type)	<input type="text"/>
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10. **COMPLETE CATALOG DESCRIPTION** including dept., number, title, credits, credit distribution, cross-listings and/or stacking (50 words or less if possible):

Example of a **complete** description:

FISH F487 W, O Fisheries Management  
3 Credits Offered Spring  
Theory and practice of fisheries management, with an emphasis on strategies utilized for the management of freshwater and marine fisheries. Prerequisites: COMM F131X or COMM F141X; ENGL F111X; ENGL F211X or ENGL F213X; ENGL F414; FISH F425; or permission of instructor. Cross-listed with NRM F487. (3+0)

MSL F394 Human Impacts to the Marine Biosphere  
3 credits  
This course will take an integrative approach examining the biological impacts of human activities on the world's oceans. Topics of discussion will include the biological impacts of: ocean acidification, increased ocean temperature, deoxygenation, ocean freshening, sea level rise, sea ice loss, human environmental disturbance, loss of biodiversity and biological invasions. Prerequisites: MSL 211 and 212 or BIOL 115 and 116 and CHEM 105; or permission from the instructor.

11. **COURSE CLASSIFICATIONS:** Undergraduate courses only. Consult with CLA Curriculum Council to apply S or H classification appropriately; otherwise leave fields blank.

H = Humanities  S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? If YES, attach form.	YES: <input type="text"/>	NO: <input checked="" type="text" value="X"/>
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IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6 <input type="text"/>	W = Writing Intensive, Format 7 <input type="text"/>	X = Baccalaureate Core <input type="text"/>
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11.A Is course content related to northern, arctic or circumpolar studies? If yes, a "snowflake" symbol will be added in the printed Catalog, and flagged in Banner.

YES <input type="text"/>	NO <input type="text"/>
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12. **COURSE REPEATABILITY:**

Is this course repeatable for credit?	YES <input type="text"/>	NO <input checked="" type="text" value="X"/>
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Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

<input type="text"/>
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How many times may the course be repeated for credit?	<input type="text"/>	TIMES
If the course can be repeated for credit, what is the maximum number of credit hours that may be earned for this course?	<input type="text"/>	CREDITS
If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?	<input type="text"/>	CREDITS

13. **GRADING SYSTEM:** Specify only one. Note: Changing the grading system for a course later on constitutes a Major Course Change - Format 2 form.

LETTER:  PASS/FAIL:

**RESTRICTIONS ON ENROLLMENT (if any)**

14. **PREREQUISITES**

MSL 211 and 212 or BIOL 115 and 116, and CHEM 105

These will be required before the student is allowed to enroll in the course

15. **SPECIAL RESTRICTIONS, CONDITIONS**

16. **PROPOSED COURSE FEES**

No

Has a memo been submitted through your dean to the Provost for fee approval?  
Yes/No

17. **PREVIOUS HISTORY**

Has the course been offered as special topics or trial course previously?  
Yes/No

No

If yes, give semester, year, course #, etc.:

18. **ESTIMATED IMPACT**

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

This course will be part of my teaching workload. I do not intend to offer this course by distance delivery. The proposed course may impact the student enrollment for MSL F216- The Oceans and Global Change.

19. **LIBRARY COLLECTIONS**

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No

Yes

There is no required text for this class.

20. **IMPACTS ON PROGRAMS/DEPTS**

What programs/departments will be affected by this proposed action?  
Include information on the Programs/Departments contacted (e.g., email, memo)

The MSL program will be impacted as the proposed course is a review of contemporary issues in marine science, thus increasing the availability of such courses to undergraduate students. The proposed class may review a few topics that are covered in Biol F485- Global Change Biology. The proposed course will solely focus on the marine environment, on a global scale, (while Biol F485 focuses on Alaska/Arctic) limiting the potential of curriculum overlap between the two classes.

21. **POSITIVE AND NEGATIVE IMPACTS**

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

This is a specialized course that is designed for marine science students (although open to anyone with the observed prerequisites), and the suite of topics covered are not currently being offered by any other class in SFOS. I spoke with Dr. Andrew McDonnell about the potential impacts to his course, 'The Oceans and Global Change, MSL F216'. Some topics in his course will be covered in my course, however, I will be primarily focusing on the biological impacts of ocean change across all levels of biological organization, from molecular responses of individual species to ecosystem structure and function. Additionally, my course will be classified as an upper division course, requiring a greater degree student engagement and productivity.

**JUSTIFICATION FOR ACTION REQUESTED**

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

Marine ecosystems worldwide are already being impacted as a result of human actions. The rate of change to these ecosystems is unprecedented, thereby underscoring the urgent need to develop and teach curriculum that clearly defines the causes and consequences of anthropogenic activities. Changes to the marine environment are complex, and require an integrative approach where the traditional discipline lines dissipate, and must be replaced by a holistic approach that appreciates this multi-faceted issue. As such, this course will draw from the fields of biology, fisheries, chemical, physical and biological oceanography, geology, social sciences, economics, indigenous studies. After taking this course, students will have a comprehensive understanding the links between anthropogenic (human) activities that drive changes to the marine physical and chemical environment and the ensuing impacts to the biological realm. Additionally, students will gain experience in research methods and science communication via exposure to peer reviewed literature and class presentations.

**APPROVALS: Add additional signature lines as needed.**

DocuSigned by: <i>Sarah Hardy</i>	Date	September 26, 2016
Signature of: Sarah Hardy, Chair, Program/Department of:	Department of Marine Biology	
DocuSigned by: <i>[Signature]</i>	Date	September 26, 2016
Signature of: [Signature], Chair, College/School Curriculum Council for:	CFOS	
DocuSigned by: <i>[Signature]</i>	Date	September 26, 2016
Signature of: [Signature] Dean, College/School of:	CFOS	

Offerings above the level of approved programs must be approved in advance by the Provost.

Signature of Provost (if above level of approved programs)	Date
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**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

Signature, Chair Faculty Senate Review Committee:	Date
<input type="checkbox"/> Curriculum Review <input type="checkbox"/> GAAC <input type="checkbox"/> Core Review <input type="checkbox"/> SADAC	

**ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)**

Signature	Date
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Signature, Chair,  
Program/Department of:

Date

Signature, Chair, College/School  
Curriculum Council for:

Date

Signature, Dean, College/School  
of:

**ATTACH COMPLETE SYLLABUS (as part of this application).** This list is online at:

<http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/uaf-syllabus-requirements/>

The Faculty Senate curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course (or changes to it) may be denied.

**SYLLABUS CHECKLIST FOR ALL UAF COURSES**

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

**1. Course information:**

Title,  number,  credits,  prerequisites,  location,  meeting time (make sure that contact hours are in line with credits).

**2. Instructor (and if applicable, Teaching Assistant) information:**

Name,  office location,  office hours,  telephone,  email address.

**3. Course readings/materials:**

Course textbook title,  author,  edition/publisher.

Supplementary readings (indicate whether  required or  recommended) and

any supplies required.

**4. Course description:**

Content of the course and how it fits into the broader curriculum;

Expected proficiencies UAF required to undertake the course, if applicable.

Inclusion of catalog description is *strongly* recommended, and

Description in syllabus must be consistent with catalog course description.

**5.  Course Goals (general), and (see #6)**

**6.  Student Learning Outcomes (more specific)**

**7. Instructional methods:**

Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

**8. Course calendar:**

A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

**9. Course policies:**

Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

**10. Evaluation:**

Specify how students will be evaluated,  what factors will be included,  their relative value, and  how they will be tabulated into grades (on a curve, absolute scores, etc.)  Publicize UAF regulations with regard to the grades of "C" and below as applicable to this course. (Not required in the syllabus, but is a convenient way to publicize this.) Link to PDF summary of grading policy for "C":

[http://www.uaf.edu/files/uafgov/Info-to-Publicize-C\\_Grading-Policy-UPDATED-May-2013.pdf](http://www.uaf.edu/files/uafgov/Info-to-Publicize-C_Grading-Policy-UPDATED-May-2013.pdf)

**11. Support Services:**

Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

**12. Disabilities Services:** Note that the phone# and location have been **updated**.

<http://www.uaf.edu/disability/> The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials.

State that you will work with the Office of Disabilities Services (208 WHITAKER BLDG, 474-5655) to provide reasonable accommodation to students with disabilities.

Revised 10/11/16

## Syllabus

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**MSL 394: Human Impacts to the Marine Biosphere**

3 Credits

Class Schedule: Fairbanks-

Prerequisites: BIOL F115, 116 or MSL 211, 212; CHEM 105

Instructor: Dr. Amanda Kelley

Class location and time TBD

School of Fisheries and Ocean Sciences

Office: Irving II rm 331

Phone: (907) 474-2474

Email: [alkelley@alaska.edu](mailto:alkelley@alaska.edu)

Office hours: TBD

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**Course Description:** This course will take an integrative approach examining the impact human activities have had on the world's oceans. We will evaluate the chemical, physical and biological changes that have occurred as a result of such activity. Topics of discussion will include biological responses to: ocean acidification, increased ocean temperature, deoxygenation, ocean freshening, sea level rise, sea ice loss, human environmental disturbance and the consequences of these changes across all levels of biological organization. In addition to these topics, this course will review the effects of human-mediated species invasion in marine habitats. Finally, we will consider the relative impact of these changes on commerce, economies, and indigenous cultures, globally and locally.

**Course Goals:** To provide an understanding of the links between physical, chemical, and biological systems and anthropogenic (human) activities.

### Specific Learning Objectives:

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- (1) Gain a conceptual understanding of the Earth's climate system- i.e. interaction between the atmosphere and the world's oceans.
- (2) Learn the drivers of ocean change (pre-civilization) from the perspective of geologic time- i.e. paleoclimatology and the cryosphere.
- (3) Understand the importance of natural ocean change and variability as a means to assess human impacts of recent ocean change.
- (4) Be able to describe in detail the processes that are responsible for the chemicophysical changes that have occurred as a result of human activity.
- (5) Understand the hierarchical biological consequences of ocean change, from cellular responses of animals to ecosystem level changes.
- (6) Learn the ecology of biological invasions.
- (7) Identify the impacts of biological invasions and ocean change on human society.

### Instructional method:

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This class will use multiple modes of learning, including: lecture, small groups, presentations, in class laboratory activities, assignments, and by reading about the scientific literature/current events in science.

### Course reading (required):

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*No textbook is required for this class.* Assigned reading will include peer-review scientific literature, science-based web pages. All readings will be posted on Blackboard.

**Class Evaluation:**

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Midterm #1.....	20 points
Midterm #2.....	20 points
Problem sets (2 points each) .....	10 points
Independent research project.....	10 points
Research project presentation.....	10 points
Final exam.....	25 points
Class participation.....	5 points
Total.....	100 points

**Grading:**

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90-100%	A
80-89%	B
70-79%	C
60-69%	D
< 59%	F

**Course Schedule: 16 weeks**

Date	Lecture Topic	Activities	Readings	Titles
1Tue	Introduction/ The Economy Value of Ocean Ecosystems and their Services		Costanza 1997, 2014	“The value of the world’s ecosystem services and natural capital” “Changes in the global value of ecosystem services”
Thurs	Drivers of Global Change- Anthropogenic CO2	CO <sub>2</sub> : Keeling Curve/Ocean pH problem set		
2Tue	Greenhouse Gases			
Thurs	Intro Paleoclimatology	Activity: Vostock Ice Cores problem set	McCulluch 1999	Coral record of equatorial sea-surface temperatures during the penultimate deglaciation at Huon Peninsula
3Tue	Ocean warming: Temperature and physiology		Somero 2005, 2010	
Thurs	Ocean warming: Species range shifts		IPCC WG1AR5 Technical Summary: Section 2.2.3 <a href="http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_TS_FINAL.pdf">http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_TS_FINAL.pdf</a>	“Linking biogeography to physiology: evolutionary & acclimatory adjustments of thermal limits” “The physiology of climate change: how potentials for acclimatization & genetic adaptation will determine ‘winners’ & ‘losers’”
4Tue	Ocean warming: Case study, <i>Mytilus</i> complex	Research report ideas due		
Thurs	Ocean warming:		NOAA: A reef manager’s	



	Thermal physiology of corals		guide to coral bleaching	
5Tue	Coral bleaching	Coral satellite images problem set		
Thurs	Midterm 1			
6Tue	Ocean acidification: Introduction	In class lab: Demonstrating the effects of ocean acidification to promote climate change understanding	Kelley et al. 2015 <a href="https://www.researchgate.net/profile/Amanda_Kelley2/publication/274720313_Demonstrating_the_Effects_of_Ocean_Acidification_on_Marine_Organisms_to_Support_Climate_Change_Understanding/links/552840af0cf29b22c9bc9b72.pdf">https://www.researchgate.net/profile/Amanda_Kelley2/publication/274720313_Demonstrating_the_Effects_of_Ocean_Acidification_on_Marine_Organisms_to_Support_Climate_Change_Understanding/links/552840af0cf29b22c9bc9b72.pdf</a>	
Thurs	Ocean acidification: Naturally acidified oceans			
7Tue	The Cryosphere: Freshwater discharge into ocean ecosystems	Sea ice extent problem set		
Thurs	Multi-stressor ocean: The importance of ecologically relevant studies	Research report outline due	Somero et al. 2016	
8Tue	Scaling up: Ocean change Impacts on ecosystem structure and function			What Changes in the Carbonate System, Oxygen, and Temperature Portend for the Northeastern Pacific Ocean: A Physiological Perspective
Thurs	Midterm 2			
9Tue	Ocean deoxygenation		Keeling et al. 2009	
Thurs	Ocean change and Salmon		<a href="https://www.nwfsc.noaa.gov/research/divisions/fe/ecoanalysis/climate-impacts-salmon.cfm">https://www.nwfsc.noaa.gov/research/divisions/fe/ecoanalysis/climate-impacts-salmon.cfm</a>	<a href="https://ioos.noaa.gov/wp-content/uploads/2016/04/keeling_et_al2010ocean_deoxygenation_in_warming_world.pdf">https://ioos.noaa.gov/wp-content/uploads/2016/04/keeling_et_al2010ocean_deoxygenation_in_warming_world.pdf</a>
10Tue	Phenology and ocean change		Edwards and Richardson, 2004	Impact of climate change on marine pelagic phenology and trophic mismatch
Thurs	Adaptation and ocean change			
11Tue	Intro: Ecology of species invasion	Optional first draft review for research report		
Thurs	Species invasion: physiology and behavior		Kelley 2015	The role thermal physiology plays in species invasion
12Tue	Impact of habitat and biodiversity loss			

Thurs	Ocean change: Sea level rise		<a href="http://oceanservice.noaa.gov/facts/sealevel.html">http://oceanservice.noaa.gov/facts/sealevel.html</a>
13Tue	Ocean change impacts on indigenous communities		<a href="https://coast.noaa.gov/digitalcoast/tols/slr">https://coast.noaa.gov/digitalcoast/tols/slr</a>
Thurs	Student research presentations	Student research report due	
14Tue	Student research presentations		
Thurs	Final exam		

### Independent Research Projects and Presentations:

Undergraduate research is considered a “high-impact practice” by the Association of American Colleges and Universities (<https://www.aacu.org/leap/hips>). The goal of this research project for this course is to involve students with actively contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to answer important questions.

The research project will be a review of current peer-reviewed literature. Students will pick an ocean change-related topic to study (for example- impact of ocean acidification on deep-sea corals). Students will generate a research outline which will be reviewed by the instructor. Using peer-reviewed research articles, students will then write a five page single spaced (no larger than 12 font) research paper (Abstract, Introduction, Methods, Discussion, and Conclusion). See class schedule for the research paper timeline- in red above. Finally, students will give a 12 minute presentation based on the results of their particular research project, with 5 minutes for questions from the audience. A grading rubric will be used to standardize the evaluation process for both the paper and the presentation.

### Course Policies:

**(1) Attendance:** Students are expected to attend all scheduled classes, and are responsible for all material presented in lecture and in the assigned readings. Students who miss class are welcome to ask to borrow the notes of their classmates; the instructor will not be responsible for providing notes. Please note that no in-class activities can be made up, regardless of the reason for missing class. Lectures will be presented using PowerPoint. Each lecture will be available prior to class. It is important to realize that these PowerPoint slides represent only an outline of the material covered. Important details that will be covered in exams will be added by the instructor verbally in each lecture and slides not posted on Blackboard may be described in lecture. Thus attending class and taking detailed notes is the key to success in this course.

**(2) Exams and assignments:** Exams will be based on any material covered during the lecture period or assigned in the reading may be included in the lecture exams. This can include textbook illustrations, films, Powerpoint slides, and actual lectures. Take notes! Quizzes may be given at any time during lecture or lab, and there will be no make-up quizzes. If you must arrive within 5 minutes after the start of lecture or lab in order to take the quiz. Make-up exams will only be available in cases of medical and/or family emergencies, or for official academic activities (in which case the instructor should be contacted a minimum of two weeks in advance). The student is responsible for scheduling timely make-up exams with the instructor.

(3) **Support and Disability Services:** The Office of Disability Services can be reached by phone- (907) 474-5655, or email- [fydso@uaf.edu](mailto:fydso@uaf.edu), and can be located in WHIT 203 on the UAF campus. The Office of Disability Services is available for students with physical or learning disabilities. If you feel that you are differently abled and need these services, please contact the office or ask the instructor to make arrangements.

(4) **Courtesy:** Please turn off all audible sounds to any electronic devices (phones, laptops, tablets etc.) while in lecture. Refrain from using your laptops for activities not related to lecture during class time, e.g. emailing or browsing the web. Use of these items is strictly prohibited during exams. Students are free to record lectures. You may bring food or drink in the classroom unless otherwise instructed, for example when shared computers are in use.

(5) **Plagiarism and academic integrity:** Plagiarism will not be tolerated in any way during this course. All assignments are expected to consist of students' original ideas and/or information from properly cited published sources. Students may seek assistance with proper referencing of scientific literature from the instructor as needed. Students are expected to conduct themselves according to the UAF Student Code of Conduct, which can be found in the course catalog. Failure to comply with these guidelines will result in a failing grade, and the student may face consequences at the university level, depending on the severity of the offense. I also use a *program that can identify plagiarism from any internet source*. So please consider this when contemplating using cut and paste for your assignments and research project.