FORMAT 1

Submit original with signatures + 1 copy + electronic copy to UAF Governance.

See http://www.uaf.edu/uafgov/faculty/cd for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL

SUBMITTED BY:

Department	**GPMSL**	**College/School**	**SFOS**
Prepared by	**Ana M. Aguilar-Islas**	**Phone**	**907 474 1524**
Email Contact	**amaguilarislas@alaska.edu clneumann@alaska.edu**	**Faculty Contact**	**Ana M. Aguilar-Islas**

1. ACTION DESIRED (CHECK ONE): Trial Course [ ] New Course [X]

2. COURSE IDENTIFICATION: Dept **MSL** Course # **663** No. of Credits **3**

Justify upper/lower division status & number of credits: This is a stacked 400/600 level course intended for students with a background in general chemistry and marine science. There will be 3 hours of lecture per week. Homework assignments, a synthesis paper (graduate level), and a presentation will be required. The grading criteria will differ between the two levels. A greater level of sophistication and understanding will be expected from graduate students and this should be demonstrated in the students' assignments and exams. In addition, a higher workload (homework and exams) will be required from graduate students.

3. PROPOSED COURSE TITLE: **Chemical Coastal Processes**

4. To be CROSS LISTED? *YES/NO* **No** If yes, Dept: [ ] Course # [ ]

(Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. To be STACKED? *YES/NO* **Yes** If yes, Dept. MSL Course # 463

6. FREQUENCY OF OFFERING: **Alternate Spring semesters**

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

7. SEMESTER & YEAR OF FIRST OFFERING (if approved) **Spring 2013**

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)	[ ] *1*	[ ] *2*	[ ] *3*	[ ] *4*	[ ] *5*	[X] *6 weeks to full semester*
OTHER FORMAT (specify)						
Mode of delivery (specify lecture, field trips, labs, etc)						

9. CONTACT HOURS PER WEEK: [3] LECTURE hours/weeks [ ] LAB hours /week [ ] PRACTICUM hours /week

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/cd/credits.html for more information on number of credits.

OTHER HOURS (specify type) [ ]

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):

MSL S663Chemical Coastal Processes
3 credits Offered Spring Odd-numbered years
A study of chemical processes in the coastal ocean. This course will examine chemical interactions at different boundaries, and explore physical and biological controls on the chemistry of coastal environments. Some of the topics to be covered include: The role of suspended particles; coastal acidification; photochemical processes; controls on coastal productivity; future challenges in coastal management. This course is intended for students with a background in general chemistry and marine science. *Prerequisite: Upper-division standing, general chemistry (i.e. CHEM 105 and CHEM 106), general oceanography (i.e. The Oceans-MSL 111), or permission from instructor for undergraduates, or graduate standing.*
Stacked with MSL 463 (3+0)

to GOV COUNCIL 12/16/10

11. *COURSE CLASSIFICATIONS:* (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities [ ] N = Natural Science [ ] S = Social Sciences [ ]

Will this course be used to fulfill a requirement for the baccalaureate core? **YES** [ ] **NO** [X]

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6 [ ] W = Writing Intensive, Format 7 [ ] Natural Science, Format 8 [ ]

12. *COURSE REPEATABILITY:*

Is this course repeatable for credit? **YES** [ ] **NO** [X]

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit? [ ] **TIMES**

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course? [ ] **CREDITS**

13. *GRADING SYSTEM:* ***Specify only one.***

LETTER: [X] **PASS/FAIL:** [ ]

RESTRICTIONS ON ENROLLMENT (if any)

14. *PREREQUISITES* For MSL 663 Graduate Standing. For MSL 463 Upper-division standing, general chemistry (i.e. CHEM 105 and CHEM 106), general oceanography (i.e. The Oceans -MSL 111), or permission from instructor.

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

RECOMMENDED

Classes, etc. that student is strongly encouraged to complete prior to this course.

15. *SPECIAL RESTRICTIONS, CONDITIONS* **None**

16. *PROPOSED COURSE FEES* **$0**

Has a memo been submitted through your dean to the Provost & VCAS 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.

No impact on budget, facilities/space. The instructor, a recently hired SFOS faculty, is developing this course to help fulfill her teaching workload (2-3 courses per academic year).

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 [X]

Communication with Anne Christie (Biosciences Library) determined the material required for the course is available from the library collection. An updated list of readings will be provided to Anne to ensure reading material is available to students during the class period.

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)

A positive impact is expected on the GPMSL by increasing the available courses offered to its students. As part of a minor in Marine Science (paperwork submitted concurrently), this course will contribute to courses offered to MSL minors. A course in chemical coastal processes will be of interest to Fisheries and Environmental Chemistry students (graduate and undergraduate).

21. POSITIVE AND NEGATIVE IMPACTS

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

No negative impacts are expected from this course. The MSL program will be impacted positively by offering a course that focuses on the coastal ocean, as the course will promote a better understanding of chemical interactions in coastal waters, and will be useful for students whose research takes place in coastal environments.

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.

The coastal ocean is particularly vulnerable to environmental change. Understanding interactions among physical, chemical, and biological processes is necessary to predict and address the effects of ongoing environmental changes. Recent developments, including coastal acidification, eutrophication, and hypoxia in productive coastal regions highlight the need for understanding the chemical interactions involved. Currently the MSL program only offers one graduate course (MSL F626) that focuses on coastal/shelf processes, and it does so from a physical standpoint. Two chemistry-focused courses offered (MSL 660 and MSL 670) address the global ocean, touching only briefly on chemical coastal processes. The proposed course will provide students with a detailed study of chemical processes in the coastal ocean, adding depth and complementing information from the existing courses. The 400-level version is intended to reach upper-division undergraduates interested in the coastal ocean. The two levels will be differentiated by the expected workload and level of understanding. Graduate students will be expected to demonstrate deeper understanding through the homework assignments and exams and will be required to submit a heavier workload.

APPROVALS:

Signature, Chair, Program/Department of: GPMSL — Date: 12/15/10

Signature, Chair, College/School Curriculum Council for: SFOS — Date: 12/15/10

Signature, Dean, College/School of: SFOS — Date: 12/15/10

Signature of Provost (if applicable) — Date:

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

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

Signature, Chair, UAF Faculty Senate Curriculum Review Committee — Date:

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

Signature, Chair, Program/Department of: — Date:

Signature, Chair, College/School Curriculum Council for: — Date:

Signature, Dean, College/School of: — Date:

ATTACH COMPLETE SYLLABUS (as part of this application).
Note: The guidelines are online: http://www.uaf.edu/uafgov/faculty/cd/syllabus.html
The department and campus wide 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 change will 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 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.)

11. Support Services:
☐ Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

12. Disabilities Services:
The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials.
☐ State that you will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities."

MSL 463: Chemical Coastal Processes

Instructor: Dr. Ana M. Aguilar-Islas
School of Fisheries and Ocean Sciences
335A Irving II
474-1524
amaguilarislas@alaska.edu

Class meeting times: TBA
Location: TBA
Office Hours: After class (1 hour)
or by appointment

Course Description

A study of chemical processes in the coastal ocean. This course will examine chemical interactions at different boundaries, and explore physical and biological controls on the chemistry of coastal environments. Some of the topics to be covered include: The role of suspended particles; coastal acidification; photochemical processes; controls on coastal productivity; future challenges in coastal management. This course is intended for students with a background in general chemistry and marine science.
Prerequisite: Upper-division standing, general chemistry (e.g. CHEM 105 and CHEM 106), general oceanography (e.g. The Oceans-MSL 111), or permission from instructor for undergraduates, or graduate standing. Stacked with MSL 663 (3+0)

Course Goals

1. To provide students with a view of the coastal ocean from a chemical perspective.
2. To generate discussion on current and future issues affecting coastal ecosystems.

Learning Objectives

1. Become familiar with chemical processes occurring in coastal/shelf waters.
2. Identify physical and biological controls affecting the distribution and behavior of chemical species.
3. Apply a topic examined during lectures to Alaskan coastal waters

Course Policies and Requirements

Lecture **attendance** and active **participation** in class is expected from all students. Class participation will count for 10% of the final grade. In addition to participation during lectures, students will be evaluated based on four homework assignments, an oral presentation, two midterms and a final..

Email communication will be used to distribute class information, updates and changes.

Four **homework assignments** will be given. Collaboration among students is encouraged. However, each student is expected to submit their own work. Homework assignments will not be accepted after the due date, unless arrangements have been made in advance with the instructor.

Exams. There will be two midterms and one final which are to be completed during the regular class period. The exams will be closed-book, and will require short-essay and diagramed answers. The final exam will be comprehensive with an emphasis on material covered after the second midterm.

Background Readings. There is no required textbook. Reading assignments will come from several books and the primary literature. Chapters from textbooks will be found on eReserves (http://eres.uaf.edu/eres/default.aspx) PASSWORD: TBA. Primary literature articles will be obtained from the library (http://library.uaf.edu/findarticles). Contact the instructor or a librarian if you need help obtaining articles.

Student Presentations: All students will make an oral presentation that highlights findings from a chosen journal article addressing a chemical process within an Alaskan/Arctic coastal region (topic and reference to be approved by instructor on week 11 (Tuesday).
Paper selection – remember that it has to be a scientific paper addressing a chemical coastal process. For example, the following paper would not be acceptable.
Wagemann, R., E. Trebacz, G. Boila, and W.L. Lockhart. 1998. Methylmercury and total mercury in tissues of arctic marine mammals. The Science of the Total Environment **218**:19-31
However, the paper below would be appropriate
Leitch D.R., J. Carrie, D. Lean, R.W. Macdonald, G.A. Stern, and F. Wang. 2007. The delivery of mercury to the Beaufort Sea of the Arctic Ocean by the Mackenzie River. The Science of the Total Environment **373**:178-195

Presentations will take place during the last week of lecture.

Note: This is a stacked 400/600 level course. The material covered will be the same for both versions of the course, but the grading will differ. To receive full credit, graduate students will be required to 1) answer the A and B portions of homework and exam questions; 2) write a 10 page synthesis paper; 3) present the topic of the synthesis paper orally to the class; 4) be able to critically evaluate the direction of future coastal/shelf research at the end of the course; and 5) attend and participate in class. While undergraduate level students will be required to 1) answer only the A portion of homework and exam questions; 2) present a published scientific paper orally to the class; and 3) attend and participate in class.

Lack of **academic integrity** including plagiarism is not acceptable and will not be tolerated.

Points and grading scale for undergraduate students

	Possible points	% of Total
Attendance and active class participation	50	10
Homework (4 assignments)	100	20
Midterm 1	100	20
Midterm 2	100	20
Presentation	50	10
Final	100	20
Total	**500**	**100**

A+	98-100%	A	93-97%	A-	90-92%
B+	87-89%	B	83-86%	B-	80-82%
C+	77-79%	C	73-76%	C-	70-72%
D+	67-69%	D	63-66%	D-	60-62%
		F	< 60%		

Support and Disability Services
At UAF, the Office of Disability Services (203 WHIT; 474-5655; TTY 474-1827; fydso@uaf.edu) ensures that students with physical or learning disabilities have equal access to the campus and course materials. If you have specialized needs, please contact this office or the instructor to make arrangements.

Lecture Schedule (Subject to change)

Week	Date	Lecture Topic	Assignment	Reading
1		Introductions, overview, logistics		
2		Coastal zone classification review		Open University Ch. 5-8
		Chemical composition and mixing		
3		Residence time and input variability		Eyre, 1998
		Floculation processes	**Homework 1 Due**	Boyle et al., 1974; Sholkovitz, 1976
4		Organic speciation of trace metals	Hwk 1 returned	van den Berg, 2000; Buck et al., 2005
		The roll of Suspended particles		Turner and Millward, 2002
5		Photochemical Processes		Sulzberger, 2000
		Photochemical Processes (cont.)	**Homework 2 Due**	Moran & Zepp, 2002
6		**Midterm 1**	Hwk 2 returned (2/21, office)	
		Carbonate system; Coastal Acidification	Midterm 1 returned	Emerson & Hedges Ch.4
7		Coastal Acidification (cont.)		Borges & Gypens, 2010
		Dissolved Oxygen; hypoxia/anoxia		Grantham et al., 2004
8		Interactions at sediment/water interface	**Homework 3 Due**	Presley and Trefry 1980; Libes Ch.12
		Sedimentary transformation of organic matter		Artemyev Ch. 4
SPRING BREAK				
9		Sedimentary transformation of trace metals	Hwk 3 returned	
		The role of bacteria		
10		The influence of sea ice		Melnikov Ch. 3
		Midterm 2		
11		Isotopes as tracers	**Topic Due.** Midterm 2 returned	Libes Ch. 5
		Isotopes as tracers (cont.)	**Homework 4 Due**	Swarzenski et al., 2000
12		Upwelling, fronts and eddies review		
		Controls on coastal productivity	Hwk 4 returned	Alongi Ch 7
13		Controls on coastal productivity (cont.)		Hutchins et al., 1998
		Interdisciplinary coastal research		Ocanography, **21**(4): 90-107,
14		Coastal Observing Systems		
		Future challenges and coastal management		Valiela Ch 14
15		Student Presentations		
		Student Presentations		
16		**Final Exam**		

Texts

Alongi, D.M. (1998) *Coastal Ecosystem Processes*. CRC Press, Boca Raton, FL, 419 pp.

Artemyev, V.E. (1996) *Geochemistry of Organic Matter in River-Sea Systems*. Kluwer Acedemic Publishers, Dordrecht, 190 pp.

Emerson, S. and Hedges, J. (2008) *Chemical Oceanography and the Marine Carbon Cycle*. Cambridge University Press, Cambridge, 453 pp.

Libes, S.M. (1992) *An introduction to Marine Biogeochemistry*. John Wiley & Sons, Inc., New York, 734 pp.
Melnikov, I.A. (1997) The Arctic Sea Ice Ecosystem. Gordon and Breach Science Publishers, Amsterdam, 204 pp.
The Open University (1997) *Waves, Tides and Shallow-Water Processes*. Butterworth-Heinemann, Oxford, 187 pp.
Valiela, I. (2006) *Global Coastal Change*. Blackwell Publishing, Malden, MA, 368 pp.

Articles

Borges, A. V. and N. Gypens. 2010. Carbonate chemistry in the coastal zone responds more strongly to eutrophication than to ocean acidification. Limnology and Oceanography, **55**(1): 346–353
Boyle, E.A., R. Collier, A.T. Dengler, J.M. Edmond, A.C. Ng, and R.F. Stallard. 1974. On the chemical mass-balance in estuaries. Geochimica et Cosmochimica Acta, **38**: 1719-1728.
Buck, K.N., J.R.M. Ross, and K.W. Bruland. 2007. A Review of total dissolved copper and its chemical speciation in San Francisco Bay, California. Environmental Research **105**: 5-19
Eyre, B. 1998. Transport, Retention and Transformation of Material in Australian Estuaries. Estuaries 21(4A): 540-551
Grantham, B.A., F. Chan, K. J. Nielsen, D. S. Fox, J. A. Barth, A. Huyer, J. Lubchenco, and B. A. Menge. 2004. Upwelling-driven nearshore hypoxia signals ecosystem and oceanographic changes in the northeast Pacific. Nature, **429**: 749-753.
Hutchins, D.A., G. R. DiTullio, Y. Zhang and K. W. Bruland. 1998. An iron limitation mosaic in the California upwelling regime. Limnology and Oceanography, **43**(6): 1037-1054
Moran, M.A. and R.G. Zepp. 2002. Role of Photoreactions in the Formation of Biologically Labile Compounds from Dissolved Organic Matter. Limnology and Oceanography, **42**(6): 1307-1316
Presley, B.J., and J.H. Trefry. 1980. Sediment-water interactions and the geochemistry of interstitial waters.
Salisbury J., M. Green, C. Hunt and J. Campbell. 2008. Coastal acidification by rivers: A new threat to shellfish? Eos, Transactions, American Geophysical Union **89**(50):513
Sholkovitz, E.R. 1976. Flocculation of dissolved and inorganic matter during the mixing of river water and sea water. Geochimica et Cosmochimica Acta, **40**: 831-845.
Sulzberger, B. 2000. Photooxidation of Dissolved Organic Matter; Role for Carbon Bioavailability and for the Penetration Depth of Solar UV-Radiation. In: Gianguzza, A., Pelizzetti, E., and Sammartano, S. (eds.), *Chemical Processes in Marine Environments*. Springer, Berlin, pp.75-90.
Swarzenski, P.W., Corbett, D.R., Smoak, J.M., and McKee, B. 2000. The use of U-Th series radionuclides and transient tracers in Oceanography: An overview. In: Hester, R.E., and Harrison, R.M. (eds.), *Chemistry in the Marine Environment*. Royal Society of Chemistry, Cambridge, 98 pp.
Turner, A. and G. E. Millward. 2002. Suspended Particles: Their Role in Estuarine Biogeochemical Cycles. Estuarine, Coastal and Shelf Science, **55**: 857–883
Van den Berg, C.M.G. 2000. Organic Complexation of Metals in Seawater. In: Gianguzza, A., Pelizzetti, E., and Sammartano, S. (eds.), *Chemical Processes in Marine Environments*. Springer, Berlin, pp.189-200.

MSL 663: Chemical Coastal Processes

Instructor: Dr. Ana M. Aguilar-Islas
School of Fisheries and Ocean Sciences
335A Irving II
474-1524
amaguilarislas@alaska.edu

Class meeting times: TBA
Location: TBA
Office Hours: After class (1 hour)
or by appointment

Course Description
A study of chemical processes in the coastal ocean. This course will examine chemical interactions at different boundaries, and explore physical and biological controls on the chemistry of coastal environments. Some of the topics to be covered include: The role of suspended particles; coastal acidification; photochemical processes; controls on coastal productivity; future challenges in coastal management. This course is intended for students with a background in general chemistry and marine science.
Prerequisite: Upper-division standing, general chemistry (e.g. CHEM 105 and CHEM 106), general oceanography (e.g. The Oceans-MSL 111), or permission from instructor for undergraduates, or graduate standing. Stacked with MSL 463 (3+0)

Course Goals
1. To provide students with a view of the coastal ocean from a chemical perspective.
2. To generate discussion on current and future issues affecting coastal ecosystems.

Learning Outcomes
1. Become familiar with chemical processes occurring in coastal/shelf waters.
2. Identify physical and biological controls affecting the distribution and behavior of chemical species.
3. Critically evaluate the direction of future coastal/shelf research.
4. Relate topics examined during lectures to Alaskan coastal waters

Course Policies and Requirements
Lecture **attendance** and active **participation** in class is expected from all students. Class participation will count for 10% of the final grade.

Email communication will be used to distribute class information, updates and changes to the syllabus.

Four **homework assignments** will be given. Collaboration among students is encouraged. However, each student is expected to submit their own work. Homework assignments will not be accepted after the due date, unless arrangements have been made in advance with the instructor.

Exams. There will be two midterms and one final which are to be completed during the regular class period. The exams will be closed-book, and will require short-essay and diagramed answers. The final exam will be comprehensive with an emphasis on material covered after the second midterm.

Background Readings. There is no required textbook. Reading assignments will come from several books and the primary literature. Chapters from textbooks will be found on eReserves (http://eres.uaf.edu/eres/default.aspx) PASSWORD: TBA. Primary literature articles will be obtained from the library (http://library.uaf.edu/findarticles). Contact the instructor or a librarian if you need help obtaining articles.

Synthesis Paper. Choose and investigate a well-defined, focused topic that will be written as a paper. You are to choose an Alaskan coastal region and synthesize 2 to 4 key journal articles on the particular chosen topic and write a synthesis overview.

1. Topics will be selected during the first week of April. You will need instructor approval before moving ahead. This is to ensure you are "on track" with a focused topic.
2. An outline with chosen references will be due on week 12 (Tuesday)
3. The paper will be due in class on week 14 (Tuesday).
4. The body of the paper should have 1.5 line spacing, size 12 font (Time or Times New Roman) and 1 inch margins – it should be approximately 9 to10 pages with appropriate figures and tables inserted into the text.
5. All tables and figures need to have proper headings or captions, and need to be properly referenced.
6. Reference format:
   In the body of the text "The concept of new production (Eppley and Peterson, 1979) has provided valuable insight …"
   In the **Reference** section at the end of the paper:
   "Eppley, R.W., and B.J. Peterson. 1979. Particulate organic matter flux and planktonic new production in the deep ocean. Nature, **282**: 677-680."
7. The synthesis needs to be in your own words. It is OK to directly use a sentence from one of the articles as long as you use quotes and reference it properly.

Topic selection – remember that it has to be a focused paper from a **chemical coastal process perspective**. For example, a paper on trace metals in seawater is not acceptable, but a focused paper on sources of mercury in the Aleutian Archipelago would be acceptable. Similarly, a paper on organic matter in seawater is not acceptable, but a focused paper on input of organic matter by the Yukon River would be acceptable.

Student Presentations: All students will make an oral presentation of highlights from their synthesis paper. Presentations will take place during the last week of lecture.

Note: This is a stacked 400/600 level course. The material covered will be the same for both versions of the course, but the grading will differ. To receive full credit, graduate students will be required to 1) answer the A and B portions of homework and exam questions; 2) write a 10 page synthesis paper; 3) present the topic of the synthesis paper orally to the class; 4) be able to critically evaluate the direction of future coastal/shelf research at the end of the course; and 5) attend and participate in class. While undergraduate level students will be required to 1) answer only the A portion of homework and exam questions; 2) present a published scientific paper orally to the class; and 3) attend and participate in class.

Lack of **academic integrity** including plagiarism is not acceptable and will not be tolerated.

Points and grading scale for graduate students

	Possible points	% of Total
Attendance and active class participation	50	10
Homework (4 assignments)	100	20
Midterm 1	75	15
Midterm 2	75	15
Paper/Presentation	100	20
Final	100	20
Total	**500**	**100**

A+	98-100%	A	93-97%	A-	90-92%
B+	87-89%	B	83-86%	B-	80-82%
C+	77-79%	C	73-76%	C-	70-72%
D+	67-69%	D	63-66%	D-	60-62%
		F	< 60%		

Support and Disability Services

At UAF, the Office of Disability Services (203 WHIT; 474-5655; TTY 474-1827; fydso@uaf.edu) ensures that students with physical or learning disabilities have equal access to the campus and course materials. If you have specialized needs, please contact this office or the instructor to make arrangements.

Lecture Schedule (Subject to change)

Week	Date	Lecture Topic	Assignment	Reading
1		Introductions, overview, logistics		
2		Coastal zone classification		Open University Ch. 5-8
		Chemical composition and mixing		
3		Residence time and input variability		Eyre, 1998
		Floculation processes	**Homework 1 Due**	Boyle et al., 1974; Sholkovitz, 1976
4		Organic speciation of trace metals	Hwk 1 returned	van den Berg, 2000; Buck et al., 2005
		The roll of Suspended particles		Turner and Millward, 2002
5		Photochemical Processes		Sulzberger, 2000
		Photochemical Processes (cont.)	**Homework 2 Due**	Moran & Zepp, 2002
6		**Midterm 1**	Hwk 2 returned (2/21, office)	
		Carbonate system; Coastal Acidification	Midterm 1 returned	Emerson & Hedges Ch.4
7		Coastal Acidification (cont.)		Borges & Gypens, 2010
		Dissolved Oxygen; hypoxia/anoxia		Grantham et al., 2004
8		Interactions at sediment/water interface	**Homework 3 Due**	Presley and Trefry 1980; Libes Ch.12
		Sedimentary transformation of organic matter		Artemyev Ch. 4
SPRING BREAK				

Week	Date	Lecture Topic	Assignment	Reading
9		Sedimentary transformation of trace metals	Hwk 3 returned	
		The role of bacteria		
10		The influence of sea ice		Melnikov Ch. 3
		Midterm 2		
11		Isotopes as tracers	**Topic Due.** Midterm 2 returned	Libes Ch. 5
		Isotopes as tracers (cont.)	**Homework 4 Due**	Swarzenski et al., 2000
12		Upwelling, fronts and eddies review	**Outline/References Due**	
		Controls on coastal productivity	Hwk 4 returned	Alongi Ch 7
13		Controls on coastal productivity (cont.)		Hutchins et al., 1998
		Interdisciplinary coastal research		Ocanography, 21(4): 90-107,
14		Coastal Observing Systems	**Paper Due**	
		Future challenges and coastal management		Valiela Ch 14
15		Student Presentations		
		Student Presentations	Papers Returned	
16		**Final Exam**		

Texts

Alongi, D.M. (1998) *Coastal Ecosystem Processes*. CRC Press, Boca Raton, FL, 419 pp.

Artemyev, V.E. (1996) *Geochemistry of Organic Matter in River-Sea Systems*. Kluwer Acedemic Publishers, Dordrecht, 190 pp.

Emerson, S. and Hedges, J. (2008) *Chemical Oceanography and the Marine Carbon Cycle*. Cambridge University Press, Cambridge, 453 pp.

Libes, S.M. (1992) *An introduction to Marine Biogeochemistry*. John Wiley & Sons, Inc., New York, 734 pp.

Melnikov, I.A. (1997) The Arctic Sea Ice Ecosystem. Gordon and Breach Science Publishers, Amsterdam, 204 pp.

The Open University (1997) *Waves, Tides and Shallow-Water Processes*. Butterworth-Heinemann, Oxford, 187 pp.

Valiela, I. (2006) *Global Coastal Change*. Blackwell Publishing, Malden, MA, 368 pp.

Articles

Borges, A. V. and N. Gypens. 2010. Carbonate chemistry in the coastal zone responds more strongly to eutrophication than to ocean acidification. Limnology and Oceanography, **55**(1): 346–353

Boyle, E.A., R. Collier, A.T. Dengler, J.M. Edmond, A.C. Ng, and R.F. Stallard. 1974. On the chemical mass-balance in estuaries. Geochimica et Cosmochimica Acta, **38**: 1719-1728.

Buck, K.N., J.R.M. Ross, and K.W. Bruland. 2007. A Review of total dissolved copper and its chemical speciation in San Francisco Bay, California. Environmental Research **105**: 5-19

Eyre, B. 1998. Transport, Retention and Transformation of Material in Australian Estuaries. Estuaries 21(4A): 540-551

Grantham, B.A., F. Chan, K. J. Nielsen, D. S. Fox, J. A. Barth, A. Huyer, J. Lubchenco, and B. A. Menge. 2004. Upwelling-driven nearshore hypoxia signals ecosystem and oceanographic changes in the northeast Pacific. Nature, **429**: 749-753.

Hutchins, D.A., G. R. DiTullio, Y. Zhang and K. W. Bruland. 1998. An iron limitation mosaic in the California upwelling regime. Limnology and Oceanography, **43**(6): 1037-1054

Moran, M.A. and R.G. Zepp. 2002. Role of Photoreactions in the Formation of Biologically Labile Compounds from Dissolved Organic Matter. Limnology and Oceanography, **42**(6): 1307-1316

Presley, B.J., and J.H. Trefry. 1980. Sediment-water interactions and the geochemistry of interstitial waters.

Salisbury J., M. Green, C. Hunt and J. Campbell. 2008. Coastal acidification by rivers: A new threat to shellfish? Eos, Transactions, American Geophysical Union **89**(50):513

Sholkovitz, E.R. 1976. Flocculation of dissolved and inorganic matter during the mixing of river water and sea water. Geochimica et Cosmochimica Acta, **40**: 831-845.

Sulzberger, B. 2000. Photooxidation of Dissolved Organic Matter; Role for Carbon Bioavailability and for the Penetration Depth of Solar UV-Radiation. In: Gianguzza, A., Pelizzetti, E., and Sammartano, S. (eds.), *Chemical Processes in Marine Environments*. Springer, Berlin, pp.75-90.

Swarzenski, P.W., Corbett, D.R., Smoak, J.M., and McKee, B. 2000. The use of U-Th series radionuclides and transient tracers in Oceanography: An overview. In: Hester, R.E., and Harrison, R.M. (eds.), *Chemistry in the Marine Environment*. Royal Society of Chemistry, Cambridge, 98 pp.

Turner, A. and G. E. Millward. 2002. Suspended Particles: Their Role in Estuarine Biogeochemical Cycles. Estuarine, Coastal and Shelf Science, **55**: 857–883

Van den Berg, C.M.G. 2000. Organic Complexation of Metals in Seawater. In: Gianguzza, A., Pelizzetti, E., and Sammartano, S. (eds.), *Chemical Processes in Marine Environments*. Springer, Berlin, pp.189-200.

Curriculum Committee SFOS

Members: Trent Sutton (Chair)
Katrin Iken
Jeremy Mathis
Andres Lopez

08 December 2010

New Course
Course Number: MSL 463/663
Course Title: Chemical Coastal Processes
Instructor: Ana Aguilar-Islas
First Time of Offering: No for graduate version, yes for undergraduate version

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General Recommendations:

On the last page of the course proposal form is a checklist of components to be included in the syllabus. Be sure to go through this checklist to make sure all components are addressed. Failure to do so could result in the delay of getting this course proposal through the UAF Curriculum Review Committee.

Faculty Senate Form:

Clarify and Address the following:

- For course identification, need to include a statement that this is a stacked course and that there will be different grading criteria for undergraduate and graduate students.
- The catalog description (section 10) must appear as it will in the actual catalog; you have title, credits, and description, but no prerequisites or course format (e.g., 3+0).
- Do not check the box for natural science (section 11).
- The UAF Curriculum Review Committee is recommending that recommended courses should not be listed (section 14).
- For section 20 on impacts, include a statement that this course is part of the Minor in Marine Science, the paperwork for which has been submitted concurrently.
- In your justification, must state how the 400-lvel and 600-level versions of this course differ.

Syllabus:

- Must list office hours.
- For the synthesis paper component, need dates for TBD.
- On page two of the graduate syllabus, must be more explicit on how grading/evaluation will be different between graduate and undergraduate students and how that will be reflected in the assignment of a final grade; must include the same for the undergraduate syllabus.

- For the lecture schedule (both grad and undergrad versions), be consistent on how abbreviate homework.
- For the undergraduate syllabus schedule, you have that a paper is due (there is no synthesis paper for undergraduates).