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	Graduate Program in Marine Science and Limnology (GPMSL)	**College/School**	School of Fisheries and Ocean Sciences
Prepared by	Andrew McDonnell	**Phone**	474-7529
Email Contact	amcdonnell@alaska.edu	**Faculty Contact**	Andrew McDonnell

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

2. COURSE IDENTIFICATION: Dept [MSL] Course # [MSL633] No. of Credits [3]

Justify upper/lower division status & number of credits:

3. PROPOSED COURSE TITLE: Integrative Oceanography

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

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* [NO] If yes, Dept. [ ] Course # [ ]

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: Fall, Odd Numbered Years

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) Fall 2015

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) **Lectures, in-class discussions, and student presentations**

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.

OTHER HOURS (specify type)

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 633 Integrative Oceanography
3 Credits, Fall Odd Years
This course explores the interactions between physical, chemical and biological processes in the ocean. A wide range of spatial scales will be considered, ranging from the large ocean gyres down to the physiochemical scales on which individual bacteria, phytoplankton and zooplankton function. The course covers case studies that provide examples of the processes, connections, and feedbacks that control the biological, chemical, and physical variability throughout the oceans. Students will improve their interdisciplinary understanding of oceanography and learn how to apply these concepts in their own research. Prerequisites: Graduate standing and completion of at least one of the following: MSL 620, MSL 630, MSL 650, or MSL 660.

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:**		**NO:**	

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

O = Oral Intensive, **Format 6** [ ] W = Writing Intensive, **Format 7** [ ] X = Baccalaureate Core [ ]

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 [ ] **NO** [ ]

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 for credit, what is the maximum number of credit hours that may be earned for this course?		**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?		**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: [X] **PASS/FAIL:** [ ]

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** | Yes

If yes, give semester, year, course #, etc.: **MSL 694 Physical, Chemical, and Biological Interactions in the Oceans,** 3 Credits, Offered Fall 2013
(The course has been renamed)

18. ESTIMATED IMPACT

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

Course will require regular classroom space, and is part of the normal teaching workload of the instructor. Video conferencing equipment is requested in order to facilitate participation at the remote sites.

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	**11/9/12- Spoke with Karen Jensen and verified texts are available for students to check out through the Electronic Book Library. Journal articles will be available through the Library website or by in class distribution.**

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)

Graduate Program in Marine Sciences and Limnology. This course has been discussed in faculty meetings. The course could also be of use to Fisheries students as an elective.

21. POSITIVE AND NEGATIVE IMPACTS

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

This course will build off of lessons learned in the core oceanography classes. This has the positive effect of reinforcing those lessons learned, and synthesizing this information in a way that allows students to make important connections between the different sub disciplines of oceanography. The course should help improve student success on their comprehensive exams. The course content and format is well aligned with GPMSL's stated Goals and Intended Outcomes Statements for M.S. and Ph.D. students (e.g. http://www.sfos.uaf.edu/academics/degrees/grad/oceanography/oceanphd.html). The course will also give students in GPMSL an additional choice of graduate level electives necessary to complete their degree. Currently there are no similar courses offered, so it does not create any conflicts with existing courses.

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

I am proposing to add this new class because the Trial course (under a different name) was successful. The course fills a need within the GPMSL curriculum of focusing on integrating interdisciplinary knowledge. Oceanography is an interdisciplinary field, and this course is designed to specifically encourage students to build causal linkages between the disciplines of chemical, physical, and biological oceanography. As such, it will enhance the quality and breadth of a UAF education. The course is designed to draw on my own strengths as a researcher and scholar to convey some of those conceptual fundamentals and practical skills on to the students by including practical research examples and an experimental design project. The learning objectives of this class communicate the emphasis not just on encouraging student mastery of the course subject matter, but also on synthesizing these concepts to design oceanographic experiments that incorporate interdisciplinary research approaches. The course content and format is well aligned with GPMSL's stated Goals and Intended Outcomes Statements for M.S. and Ph.D. students, and as such will serve an important role in the program. Because it reaches across several disciplines, it has the potential to attract a larger class size than is typical for many graduate level oceanography electives. In doing so, students from different disciplines will also learn to work together and collaborate on interdisciplinary research questions.

APPROVALS: Add additional signature lines as needed.

	Date	12/17/14
Signature, Chair, Program/Department of:	GPMSL	
See attached	Date	12.17.14
Signature, Chair, College/School Curriculum Council for:	SFOS	
	Date	12/17/14
Signature, Dean, College/School of:	SFOS	

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

	Date	

Signature of Provost (if above level of approved programs)

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

	Date	

Signature, Chair
Faculty Senate Review Committee: ___Curriculum Review ___GAAC

___Core Review ___SADAC

UNIVERSITY of ALASKA

Christina Neumann <clneumann@alaska.edu>

MSL 215

Ana Aguilar-Islas <amaguilarislas@alaska.edu> Wed, Dec 17, 2014 at 12:07 PM
To: Christina Neumann <clneumann@alaska.edu>

Hello Christina,
Andrews MSL 663 is ready to go. I'm looking at Himelbloom's now and will let you know in a bit
[Quoted text hidden]

Course Syllabus
MSL 633: Integrative Oceanography
Fall 2015

Instructor:
Dr. Andrew McDonnell
Assistant Professor of Oceanography
School of Fisheries and Ocean Sciences
231 Irving II
907-474-7529
amcdonnell@alaska.edu
Office Hours: Tuesday & Thursday 2-3 pm

Class meeting times: Tuesday & Thursday 8:00 - 9:30 am
Location: Irving II, Room 138
Prerequisites: Graduate standing and completion of at least one of the following: MSL 620, MSL 630, MSL 650, MSL 660.
3 credits

Course Description:

This course explores the interactions between physical, chemical and biological processes in the ocean. A wide range of spatial scales will be considered, ranging from the large ocean gyres down to the physiochemical scales on which individual bacteria, phytoplankton and zooplankton function. The course covers case studies that provide examples of the processes, connections, and feedbacks that control the biological, chemical, and physical variability throughout the oceans. Students will improve their interdisciplinary understanding of oceanography and learn how to apply these concepts in their own research.

Course Goals

The goal of this course is to gain an integrative understanding of the core oceanography disciplines and prepare students for interdisciplinary and collaborative research in oceanography.

Learning Objectives

- Understand the principles, mechanisms, and examples of biological, chemical, and physical interactions in the oceans
- Develop the ability to search, read, analyze, connect, synthesize, and discuss research results in the peer reviewed literature
- Learn how to leverage the knowledge and tools of other oceanographic disciplines to enhance understanding in your own field of study
- Apply course concepts to the design of oceanographic research studies
- Evaluate how global change might affect the physical, chemical, and biological features and processes in the ocean
- Prepare students for their comprehensive exams in oceanography

Instructional methods

This course will consist of lectures intermixed with classroom discussions of the outside readings and literature searches. The course is centered around two textbooks, as well as specific journal articles that highlight case studies or serve as a comprehensive review of a specific course topic. Students will give two presentations during the semester. A Topical Review Paper and Experimental Design Project are designed to apply the concepts learned in this class to real problems in oceanographic research through individual and group activities.

Class Participation:

Attendance, participation in class sessions, discussions, and presentations is required and factors into the overall course grade. Each class session is worth up to 5 points. See "Course Policies" below for information on scheduled or unforeseen absences.

Course Readings/Homework:

The assigned course readings are all required and essential to meeting the course learning objectives. Reading and Homework assignments will be assigned. Each homework assignment is worth 10 points.

Topical Review Paper

Students will choose a specific oceanographic topic that highlights the interactions between physical, biological, and chemical processes in the ocean. The paper will involve conducting literature searches, reading the relevant papers, formulating a conceptual understanding of the processes, and writing a 10 page review paper (plus bibliography). Students will deliver a 15 minute presentation on their findings. 100 points.

Experimental Design Project

This is a collaborative project with a group size of 3-4 students. This collaboration will be initiated during the Experimental Design Project Simulation (see calendar). Students will partner with other students from a different oceanographic discipline from their own, and play the roles of senior scientists/professors to identify an interesting problem, and devise a scientific study to address the interactions between biological, physical and chemical processes. Through the course of the project, students will review the relevant background information related to the project, list the hypotheses that will be tested, describe the objectives of the proposed research, describe the methodology, and discuss how the proposed research will test these hypotheses and accomplish the proposed objectives. The proposed study will be summarized in a brief report and presented to the class (20 minute presentation + discussion/questions). 100 points.

Grade Weighting

Points from each of the following categories will be weighted according to the following scale in order to obtain an overall percentage course grade.

20% Class Participation
30% Homework
25% Topical Review Paper
25% Experimental Design Project

Grading Scale

After weighting the total scores from each category according to the weights specified above, total grade percentages will be rounded to the nearest whole percentage point and letter grades will be assigned according to the following scale (no plus or minus grading):

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

Course Policies

Attendance to class is required and it is expected that each student contribute questions, comments, and analyses of the topic being covered. This attendance and involvement is factored into the

course grade ("Class Participation" category). If a student must miss a class due to required field work or conferences, please meet with the instructor ahead of time to discuss options for making up points from missed attendance. All students are expected to adhere to the Code of Conduct and other policies described in the University of Alaska Fairbanks Catalogue.

Support Services

Students are encouraged to visit the instructor's office hours for additional help with course concepts, assignments, and exam preparation.

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.

Course Materials:

Textbooks

The following texts are recommended as a reference and resource for the class, but are not required. They can be purchased online or checked out (for FREE) through the UAF Electronic Book Library.

Dynamics of Marine Ecosystems : Biological-Physical Interactions in the Oceans - 3rd Edition (2006), by K. Mann and J. Lazier. Blackwell Publishing.

Ocean dynamics and the carbon cycle: principles and mechanisms, (2011) Williams, R. G., & Follows, M. J. Cambridge University Press.

Journal Articles

Select journal articles of relevance to each topic will be distributed via email or blackboard. Additional scientific literature can be obtained online or through the universities library system.

Breitburg, D. L., Crump, B. C., Dabiri, J. O., & Gallegos, C. L. (2010). Ecosystem engineers in the pelagic realm: alteration of habitat by species ranging from microbes to jellyfish. *Integrative and Comparative Biology*, *50*(2), 188-200.

Deutsch, C., Sarmiento, J. L., Sigman, D. M., Gruber, N., & Dunne, J. P. (2007). Spatial coupling of nitrogen inputs and losses in the ocean. *Nature*, *445*(7124), 163-167.

Dewar, W. K., Bingham, R., Iverson, R., Nowacek, D. P., St Laurent, L. C., & Wiebe, P. H. (2006). Does the marine biosphere mix the ocean? *Journal of Marine Research*, *64*(4), 541-561.

Gilg, M. R., & Hilbish, T. J. (2003). The geography of marine larval dispersal: coupling genetics with fine-scale physical oceanography. *Ecology*, *84*(11), 2989-2998.

Graham, W. M., & Largier, J. L. (1997). Upwelling shadows as nearshore retention sites: the example of northern Monterey Bay. *Continental Shelf Research*, *17*(5), 509-532.

Gruber, N., Lachkar, Z., Frenzel, H., Marchesiello, P., Münnich, M., McWilliams, J. C., et al. (2011). Eddy-induced reduction of biological production in eastern boundary upwelling systems. *Nature Geoscience*.

Ladd, C., Crawford, W. R., Harpold, C. E., Johnson, W. K., Kachel, N. B., Stabeno, P. J., et al. (2009). A synoptic survey of young mesoscale eddies in the Eastern Gulf of Alaska. *Deep Sea Research Part II: Topical Studies in Oceanography*, *56*(24), 2460-2473.

Largier, J. L. (2003). Considerations in estimating larval dispersal distances from oceanographic data. *Ecological Applications*, *13*(sp1), 71-89.

Martin, A. (2003). Phytoplankton patchiness: the role of lateral stirring and mixing. *Progress in Oceanography*, *57*(2), 125-174.

McGillicuddy, D. J., Anderson, L. A., Bates, N. R., Bibby, T., Buesseler, K. O., Carlson, C. A., et al. (2007). Eddy/wind interactions stimulate extraordinary mid-ocean plankton blooms. *Science*, *316*(5827), 1021-1026.

Course Schedule

Class Session	Date	Topic	Reading/Assignments
1		Course Introduction	Syllabus
2		Boundary Layers and phytoplankton	Mann and Lazier, Ch. 2
3		Zooplankton & Particles in a viscous environment	Mann and Lazier, Ch. 2
4		Ecosystem Engineers: Biology Shaping the Physical/Chemical Environment	Brietburg et al, 2010
5		Biological Controls on Sea Surface Temperature	
6		Plankton Patchiness	Martin 2003
7-8		Vertical Structure of the open ocean: mixed layer dynamics	Mann and Lazier, Chpt. 3; Dewar et al 2006
9-10		Coastal Upwelling	Mann and Lazier, Ch. 5;
11-12		Fronts, Jets, and Squirts	Mann and Lazier, Ch. 6; HW1 due
13-14		Dispersal of particles, plankton, and larvae	Williams and Follows Ch. 3; Largier 2003; Gilg et al 2003; Morgan & Fisher 2010
15-16		Eddies, nutrient supply, and production	Williams and Follows Ch. 9; Ladd et al 2009, McGillicuddy et al 2007, Gruber et al 2011
17-18		**Topical Review Presentations**	
19		**Experimental Design Project Simulation**	
20-21		Ocean Gyres and biogeography	Williams and Follows Ch. 8, 11

22-23		Overturning circulation and nutrient cycling	Williams and Follows Ch. 12; Deutsch et al 2007, HW2 due
24-25		Climate Variability and Biological Forcing	Mann and Lazier, Ch. 10
26-27		**Experimental Design Presentations**	Experimental Design Project Due
28		Review Session	
Finals		**Final Exam**	

Curriculum Committee SFOS

Members: Ana Aguilar-Islas (Chair)
Jeffrey Falke
Katrin Iken
Andres Lopez

5 December 2014

Trial Course
Course Number: MSL 633
Course Title: Integrative Oceanography
Instructor: McDonnell
First Time of Offering: No

General Comments and Recommendations:
A good addition to the elective course pool for GPMSL that might have appeal for fisheries oceanography students.

Faculty Senate Form:

Clarify and Address the following:

- Section 2: Course number is 633
- Section 10: Add prerequisites and contact hours after course description
- Section 20 and 21: Could include Fisheries (fisheries oceanography students might become interested in this course as an elective)
- Section 21: Remove "T" at end of paragraph

Syllabus:

- Class Participation: Include a sentence to direct them to "course policies" for information on scheduled and unforeseen absences.
- Course Schedule: Include due dates for homework and projects. This information could be added to the Topic or Reading columns.