

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	SFOS	College/School	SFOS
Prepared by	Sarah Hardy	Phone	907-474-7616
Email Contact	smhardy@alaska.edu; cneumann@alaska.edu	Faculty Contact	Sarah Hardy

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

2. COURSE IDENTIFICATION:  
 Dept:  Course #:  No. of Credits:

Justify upper/lower division status & number of credits:  
 This course will be stacked with a graduate-level course (MSL 612), and will have different grading criteria than the 600-level version. It is aimed at undergraduate students with a strong background in biology and/or marine science, beyond the level of most lower-division students. The course is comprised of 3 hours of lecture per week.

3. PROPOSED COURSE TITLE:

4. CROSS LISTED? YES/NO:   
 If yes, Dept:  Course #:   
 (Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. STACKED? YES/NO:   
 If yes, Dept:  Course #:

6. FREQUENCY OF OFFERING:   
 (Every or Alternate) Fall, Spring, Summer – or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (if approved):  Per Registrar: Fall 2012.

**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 one)  
 1  2  3  4  5  6 weeks to full semester

OTHER FORMAT (specify):

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

9. CONTACT HOURS PER WEEK:  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):

to UAF GOV 12/15/10

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

MSL 412 Early life histories of marine invertebrates

3 credits Offered Fall

This course will explore the diversity of reproductive strategies and larval forms in marine invertebrates, and consider selective pressures governing the evolution of these forms. Topics include: larval ecology and evolution, environmental constraints on early life-histories, reproductive biology, population dynamics, and larval mortality, dispersal and recruitment. Prerequisites: MSL 212 (3+0)

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

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

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

[Empty box for justification]

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:

LETTER:  PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES MSL 212, or permission of instructor

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

RECOMMENDED BIOL 305 (Invertebrate zoology) or BIOL 450 (Marine Biology and Ecology Field Course)

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

15. SPECIAL RESTRICTIONS, CONDITIONS

none

16. PROPOSED COURSE FEES

none

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

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

Spring 2010 (MSL 693)

18. ESTIMATED IMPACT

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

None. The course will be taught by an existing faculty member as part of the contractual teaching obligation. No specialized facilities are required for this course.

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (ffklj@uaf.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	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	During the period when this course was offered as a "special topics" course, continuous communication was maintained with Anne Christie in the BioSci library. Anne has received a copy of the syllabus and tentative reading list, and it was determined that all reading materials needed are available through the library.
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**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 by an increase in the diversity of course offerings available to undergraduate students. This course will also satisfy requirements for the new undergraduate minor in Marine Science that has been proposed concurrently. Topics covered will also be of interest to FISH students, particularly for those interested in aquaculture and shellfish resources.

**21. POSITIVE AND NEGATIVE IMPACTS**

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

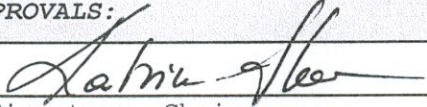
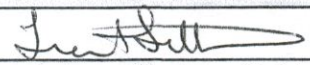
The MSL program has identified a need for this specialized course to serve their students, and thus a faculty position was created for an instructor with expertise in this field to develop just such a course. The course is therefore expected to closely complement the existing offerings, and address a specific gap within the program. No negative impacts are expected from this course.

**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.

Understanding the processes that influence survival and movement of larval forms is essential to a wide variety of current issues in marine ecology, particularly in Alaskan waters, including invasive species, climate impacts on species ranges, fisheries resource management, and establishment of marine reserves. This course will give students an in-depth exposure to this important topic, which is currently only briefly dealt with in survey courses. The 400-level students in this course will be subjected to different grading criteria and expectations than the 600-level students in that graduate-level students will be expected to complete additional assignments (oral presentation, mock manuscript review) and take leadership roles in group discussions of the scientific literature.

**APPROVALS:**

	Date	10 Dec 2010
Signature, Chair, Program/Department of:	GPMSL	
	Date	13 Dec 2010
Signature, Chair, College/School Curriculum Council for:	SFOS	
 	Date	 
Signature, Dean, College/School of:	 	
 	Date	 

Signature of Provost (if applicable)

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

Date

Signature, Chair, UAF Faculty Senate Curriculum  
Review Committee

**ADDITIONAL SIGNATURES: (If required)**

Date

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).**

Note: syllabus must follow the guidelines discussed in the Faculty Senate Guide

<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  Student Learning Outcomes (more specific)**

**6. 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.).

**7. 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.

**8. Course policies:**

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

**9. 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.)

**10. Support Services:**

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

**11. 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 (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities."

## MSL 412: Early Life Histories of Marine Invertebrates (3 credits)

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**Instructor: Dr. Sarah M. Hardy**  
School of Fisheries and Ocean Sciences  
233 Irving II  
907-474-7616  
[smhardy@alaska.edu](mailto:smhardy@alaska.edu)

**Class meeting times: T/Th 3:30 – 5:10**  
Location: TBA  
Office hours: T/Th 1:00 – 3:00

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**Prerequisites:** MSL 212, or permission of instructor.

### Course Description

This course will explore the diversity of reproductive strategies and larval forms in marine invertebrates, and consider selective pressures governing the evolution of these forms. Topics include: larval ecology and evolution, environmental constraints on early life-histories, reproductive biology, population dynamics, and larval mortality, dispersal and recruitment.

**Course Goals:** In this course, advanced students in marine science will gain an in-depth look at the reproductive biology of marine invertebrates. We will explore invertebrate reproduction, from the production of eggs and sperm to the successful transformation into the juvenile form, and all steps in between. Throughout this course we will consider environmental constraints on reproduction and larval ecology, and their effects on the evolution of early life-history strategies in the marine environment. The production, movement, and survival of larval forms is a central theme in many current issues in marine ecology, including invasive species, establishment of marine reserves, and impacts of climate change on marine communities. This course thus aims to provide students with a solid understanding of reproductive ecology, and an opportunity to critically examine current research in the field. The course will be structured in a lecture format, but will include regular group discussions of the primary literature.

### Learning Objectives

1. Identify common invertebrate larval forms, become familiar with the classification schemes used to describe larvae, and understand the role of larval forms in defining invertebrate taxonomic relationships.
2. Become familiar with the basic biological processes of gamete production, fertilization, embryogenesis, and larval development in marine invertebrates.
3. Examine the influence of environmental variables on larval development, dispersal and recruitment, and consider the potential effects of these variables on the evolution of marine life-history strategies.
4. Critically evaluate and discuss current research topics in which marine life-history strategies play an important role.
5. Explore current research methods relevant to life-history studies.

### Instructional Methods and Course Policies

Instruction will consist primarily of lectures, but frequent **group discussion** of the scientific literature will also be an important aspect of the course (see below). Class participation and

active engagement in these discussions is expected from ALL students. Key ideas presented in group discussions can also be expected to appear on exams. Points for class **participation** will be applied toward the final grade, as indicated below. Excessive tardiness and/or absence are unacceptable. This is an advanced course, and students are expected to conduct themselves as young professionals. More than two unexplained incidents of tardiness or absence will result in a deduction of points from the participation grade.

*Check your email regularly, and be sure I have your current contact information throughout the semester. Also, make sure you have a valid login for Blackboard.* Class information, lecture notes, schedule updates, and readings will be made available via Blackboard. We will also be using Blackboard to facilitate discussions of some of the readings.

Two **midterms** and one **final exam** will be given during the course. These exams will be written, closed-book, short-answer and/or essay exams, and must be completed during the normal class period. The final exam will include material presented throughout the semester, but will be weighted toward material covered after the second midterm. In the case of work-related student travel, illness, or other emergency, make-up exams can be arranged. However, students are required to notify the instructor of their planned absence via email or voicemail prior to the class period in which the exam is scheduled.

### **Group Discussions**

Plan on discussing as many as three readings from the primary scientific literature each week. Readings will be selected by the instructor, unless otherwise noted, and will be distributed via email a week in advance. All students will be expected to participate in discussions. In many cases, students may be asked to post a comment or question on a Blackboard discussion group that is related to the reading. These posts are to be written *prior* to the class for which the reading is assigned. Postings will be used to stimulate additional in-class verbal discussions. This process is very important in developing a command of the scientific literature and identifying factors that will make our own writing interesting, effective, and publishable—PLEASE BE PREPARED. When preparing for these sessions, ask yourself the following questions, which we will use as a guide for our discussion:

- Why was this reading assigned? What is the relevance to the lecture topic?
- What is the purpose of the paper? Is the purpose clearly stated? Justified?
- Question/Objective/Hypotheses: Is the question or hypothesis well-stated? Is it relevant to the stated purpose?
- Methods: Are the methods sound? Are they appropriate to the hypothesis stated? What would you do differently? What assumptions are inherent in the methods? Are these assumptions reasonable/acceptable/justified?
- Results: What are the key results? Do they address the stated hypothesis? Was the hypothesis accepted/rejected? Do the figures present the results clearly? Identify figures that are



especially useful in conveying the important findings—what do you like about them? What do they tell you?

- Discussion: Do the conclusions follow from the results? Are they presented in a broader context of other work done in the field? Are there broader implications for the field of marine science/biology/fisheries? Are the results relevant in any way to your own work? Are there any major questions suggested by the findings? What would you propose as 'the next step' for this line of research?
- General editorial critique: Was the paper easy to follow? Why or why not? Was there information missing that would have helped clarify any aspect of the study? Did each section of the paper contain the appropriate material? Were the figures clear, useful, and easy to interpret?

### Readings

**No textbook is required for this course**; readings will be assigned from the primary literature. All readings will be posted on Blackboard. In addition to required **discussion readings**, the instructor will provide a general **review paper or book chapter** for each topic wherever possible. These review papers are listed on the lecture schedule below. A **master reading list** organized by topic will also be posted on Blackboard and updated periodically throughout the semester. This list will contain citations for all references provided to you, as well as those cited in lectures and any additional papers of potential interest. If you have trouble obtaining any of these references from the library, ask the instructor for assistance.

PLEASE NOTE: As advanced students in the natural sciences, a command of the current literature in your field is essential, as is an ability to allocate your time in the most effective manner. *I will thus expect you to take responsibility for deciding how and where to spend your time on readings.* Here are a few guidelines:

- Readings from the published scientific literature will be discussed in class, as described above. In preparing exam questions, I WILL assume you are familiar with the general concepts and ideas presented in these readings. I WILL NOT expect you to recall detailed information about, e.g., specific figures, etc.
- Review papers may be used in lieu of a text book. How you use them is up to you. If you feel you need a source of additional background reading on lecture topics, skim the reviews for relevant points. If not, consider them an addition to your personal library.
- I will present results and ideas from the relevant scientific literature in lectures, and will provide citations on the slides wherever appropriate. If I mentioned it in class, that probably means I think it is important, so refer to the master reading list if you missed something or want to take a closer look at an original source mentioned in lecture.

Several useful (but not required) **texts** are listed below. These books will be placed on physical reserve at the UAF BioSci Library for the entire semester. A good invertebrate zoology text (e.g., Brusca & Brusca) is recommended and should be in the library of all marine biology students; if you do not already own one, you may want to consider a purchase (used copies can often be found for low prices):

Brusca, R.C. & Brusca, G.J. (2003) *Invertebrates*. Sinauer & Associates, Inc., Sunderland, MA, 936 pp.

*[Particularly useful chapters include Ch. 4 on reproduction and larval forms.]*

McEdward, L. (1995) Ecology of Marine Invertebrate Larvae. CRC Press, Boca Raton, 464 pp.

*[A collection of review papers that summarize many of the topics we will cover in this course.*

*Although these papers are several years old, they are still useful as reviews of the "classic" literature.]*

Gilbert, S.F. (2006) Developmental Biology. Sinauer & Associates, Inc., Sunderland, MA, 817 pp.

*[A developmental biology text with more detailed information on early embryology, including gene expression, cell communication, and other topics of potential interest.]*

Young, C. M., Sewell, M. A. & Rice, M. E. (2002) Atlas of Marine Invertebrate Larvae. Academic Press, San Diego, 626 pp. *[A beautiful illustrated atlas of larval forms organized by phyla, with good general information about the life-cycle of each group.]*

**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.

### Grading

Grades will be determined based on the absolute points awarded for the following requirements:

	<u>Possible points</u>	<u>% of total</u>
Participation (attendance, preparedness, discussions)	75	15
Discussion board postings	75	15
Midterm1	100	20
Midterm 2	100	20
Final exam	150	30
<b>Total</b>	<b>500 pts.</b>	<b>100%</b>

Semester grades will be assigned according to the following scale:

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

The Office of Disability Services (203 WHIT; 474-5655; [fydso@uaf.edu](mailto:fydso@uaf.edu)) implements the Americans with Disabilities Act and insures that UAF students have equal access to the campus and course materials. Students with physical or learning disabilities should contact this office, or the instructor, as soon as possible so that suitable arrangements can be made to accommodate specialized needs.

**Lecture Schedule (\*\*Subject to change\*\*):**

Week	Date	Lecture Topic	Assignments/Readings
1	9/2	Introductions, Course overview and goals	
2	9/7	Invertebrate zoology review; Classification of life-history modes	Brusca & Brusca Ch. 4; McEdward Ch. 1
	9/9	Embryology review; Generalized larval forms	Nielsen 1998
3	9/14	Origin of complex life cycles: Why are there larvae?	McEdward Ch. 13
	9/16	Diversity of life-history modes	Young et al. 2002 text as needed
4	9/21	Diversity of life-history modes (cont.)	
	9/23	Diversity of life-history modes (cont.)	
5	9/28	<b>Guest lecture</b> (Katrin Iken): Reproduction in macroalgae	
	9/30	Evolutionary transitions in life-history modes	McEdward Ch. 3
6	10/5	<b>Midterm #1</b>	
	10/7	Evolution of brooding	Strathmann & Strathmann 1982
7	10/12	Egg size models	McEdward Ch. 2
	10/14	Larval mortality and selective pressures	Strathmann 2007
8	10/19	Fertilization; gamete competition; sexual selection	Levitan 1998; Yund 2000
	10/21	Special topics: Reproduction in the deep-sea	Young 2004
9	10/26	Maternal investment; Gametogenesis and spawning	McEdward Ch. 5; Marshall et al. 2008
	10/28	Larval diet and nutrition	McEdward Ch. 7
10	11/2	Latent effects of larval experience	Pechenik 2006
	11/4	Larval swimming and feeding; Boundary layer processes	Metaxas 2001
11	11/9	<b>Midterm #2</b>	
	11/11	Special topics: Ocean acidification effects on larvae	Dupont & Thorndyke 2009
12	11/16	Larval dispersal: Physical processes and population connectivity	
	11/18	Larval dispersal, range size, and population effects	Shanks 2009
13	11/23	<b>Guest lecture</b> (Georgina Gibson): Dispersal modeling	
	11/25	Recruitment processes: Larval behavior and habitat selection	Elkin & Marshall 2007
14	11/30	Recruitment and population dynamics	Menge 2000

	12/2	Special topics: Marine protected area design principles	Gaines et al. 2007
15	12/7	Graduate student presentations	
	12/9	Graduate student presentations	
16		<b>Final exam</b>	

## Curriculum Committee SFOS

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

08 December 2010

### **New Course**

**Course Number:** MSL 412

**Course Title:** Early Life Histories of Marine Invertebrates

**Instructor:** Hardy

**First Time of Offering:** No

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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 must include the prerequisites and course format (e.g., 3+0); you only had the title, credits, and course description. No hyphen between life and histories. Your course description must match the syllabus.
- Not a natural science course so do not check that box.
- For prerequisites, just MSL 212 or permission of instructor (MSL 211 is implied as is a prereq for MSL 212).
- The UAF Curriculum Review Committee is recommending that recommended courses should not be listed.
- State "None" for special restrictions.
- In your justification, must state how the 400-level and 600-level versions of this course differ.

### **Syllabus:**

- Office hours have to be provided and posted, cannot be just by appointment.
- The course description on the syllabus must match the course description on the form (UAF requirement).
- For the plagiarism. Last line, change to reflect that plagiarism will result in an F grade, zero for the assignment, or failing the class, etc.