

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	Physics	College/School	CNSM

Prepared by	Renate Wackerbauer	Phone	474-6108
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Email Contact	rawackerbauer@alaska.edu	Faculty Contact	Renate Wackerbauer
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1. ACTION DESIRED (CHECK ONE):	Trial Course	<input type="checkbox"/>	New Course	<input checked="" type="checkbox"/>
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2. COURSE IDENTIFICATION:	Dept	PHYS	Course #	400	No. of Credits	0
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Justify upper/lower division status & number of credits:	in capstone project a student synthesizes concepts learned across various undergraduate physics course work
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3. PROPOSED COURSE TITLE:	Capstone Project
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4. To be CROSS LISTED? YES/NO	No	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	No	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?:	
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* 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.

RECEIVED

FEB 0 1 2016

Dean's Office
 College of Natural Science & Mathematics

6. FREQUENCY OF OFFERING:

Fall, Spring, Summer; every year

Fall, Spring, Summer; every year

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

Fall 2016

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)**

capstone project is a 0 credit course, used to keep track of (by department and registrar) which student initiated or has passed a capstone project. students doing a capstone project sign up for undergraduate research (at least 2 credits), or individual study (at least 2 credits), or participate at the international university physics competition.

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

capstone project is a 0 credit course, used to keep track of (by department and registrar) which student initiated or has passed a capstone project.

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-senate/curriculum/course-degree-procedures-guidelines-for-computing/> for more information on number of credits.

OTHER HOURS (specify type)

capstone project is a 0 credit course, used to keep track of (by department and registrar) which student initiated or has passed a capstone project. students doing a capstone project sign up for undergraduate research (at least 2 credits), or individual study (at least 2 credits), or participate at the international university physics competition.

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)

PHYS F400 Capstone Project
0 Credits Offered Fall, Spring, Summer
This course should be taken by students during the semester they initiate a capstone research project. The capstone project must include the evaluation of data and communication of the study intent, methods, results, interpretation and conclusion in the context of existing literature and knowledge. The capstone project may be completed as individual undergraduate research with a faculty member, as independent study with a faculty member within a 300 or 400 level physics course, or as participation in the international University Physics Competition. The duration of the course may exceed one semester. *Prerequisites:* PHYS 220; 301; or permission of 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:

NO:

X

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

X

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:

PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES

PHYS 220; 301; or permission of instructor

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

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

0
\$

Has a memo been submitted through your dean to the Provost for fee approval?

Yes/No

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.:

capstone project has not been offered before, but the components included (undergraduate research PHYS 488, individual study PHYS 497) have been offered before and exist in the catalog

18. ESTIMATED IMPACT

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

A capstone project is now a university requirement for every BS degree. Faculty will mentor the capstone project through undergraduate research credits or individual study credits, which will enter into the faculty's teaching workload distribution. The department has the Noyes computer lab available to students, an increase in facilities/space is not expected.

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	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>
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Requirements will depend on the particular project of the student. Library collections are adequate for faculty research, and faculty mentor the student research.

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)

does not affect other programs

21. POSITIVE AND NEGATIVE IMPACTS

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

A capstone project is now a university requirement for every BS degree. The department is fulfilling this requirement through 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.

A capstone project is now a university requirement for every BS degree. The department is fulfilling this requirement through this course

students doing a capstone project sign up for undergraduate research (at least 2 credits), individual study (at least 2 credits), or participate at the international university physics competition.


APPROVALS: Add additional signature lines as needed.

	Date	1/21/2016
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Signature, Chair, Program/Department of:	Physics
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	Date	2-1-16
---	------	--------

Signature, Chair, College/School Curriculum Council for:	CNSM
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	Date	2/1/16
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Signature, Dean, College/School of:	CNSM
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Offerings above the level of approved programs must be approved in advance by the Provost.

	Date	
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Signature of Provost (if above level of approved programs)	
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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

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

	Date	
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Signature, Chair, Program/Department of: _____

Date 5-29-16

Signature, Chair, College/School Curriculum Council for: CNSM

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:

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

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

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

3. Course readings/materials:

θ Course textbook title, θ author, θ edition/publisher.
θ Supplementary readings (indicate whether θ required or θ recommended) and
θ any supplies required.

4. Course description:

θ Content of the course and how it fits into the broader curriculum;
θ Expected proficiencies required to undertake the course, if applicable.
θ Inclusion of catalog description is *strongly* recommended, and
θ Description in syllabus must be consistent with catalog course description.

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

6. θ Student Learning Outcomes (more specific)

7. Instructional methods:

θ 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

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.

5/21/2013

PHYSICS F400 - CAPSTONE PROJECT

Spring 2016

0 credits

Prerequisites: PHYS F220; PHYS F301; or permission of the course coordinator

Course Coordinator

Physics Department Chair,

Renate Wackerbauer

Office hours: by appointment, rawackerbauer@alaska.edu

Overview

This course is a requirement for the BS physics degree. It represents a mentored research project on a physics topic or on a related topic that applies physical problem solving skills. The capstone project must be designed or chosen by the student in consultation with a faculty mentor. The faculty mentor must approve the project before work begins. The project must include evaluation of data and communication of the study intent, methods, results, interpretation and conclusion in the context of existing literature and knowledge.

PHYS F400 is not a traditional course; there are no class meetings, and no credit is associated with the course completion. Rather think of it as a tool to a) make your capstone experience visible in your transcript and to b) represent a tracking method for the Physics Department and the UAF Registrar to identify which students are currently undertaking or have successfully completed the capstone requirement for graduation.

A capstone project may extend across several semesters, or an initial project may be abandoned in favor of a new one. In these cases, there is no need to register for this class repeatedly. If the capstone project is not completed satisfactorily within a semester, the grade in PHYS F400 will be deferred until a later semester.

Catalog Course Description

This course should be taken by students during the semester they initiate a capstone research project. The capstone project must include the evaluation of data and communication of the study intent, methods, results, interpretation and conclusion in the context of existing literature and knowledge. The capstone project may be completed as individual undergraduate research with a faculty member, as independent study with a faculty member within a 300 or 400 level physics course, or as participation in the international University Physics Competition. The duration of the course may exceed one semester.

Course Goals and Learning Objectives

The broad goal of the capstone project is to integrate knowledge and skills learned in previous courses, including scientific knowledge, quantitative literacy, and communication skills, and to apply these products of the university education to a creative activity. For a physicist, a fundamental expression of applied knowledge, creativity, and critical reasoning is to engage in scientific inquiry.

The learning objectives of the capstone project are as follows:

1. Learn through experience to pose and test physics hypotheses
2. Employ critical thinking by evaluating scientific literature in the subject area
3. Reinforce and enhance quantitative knowledge by analyzing and interpreting data
4. Reinforce and enhance writing skills by communicating science
5. Reinforce and enhance oral presentation skills by communicating science

Capstone Project Options

The capstone project must be designed or chosen by the student in consultation with a faculty mentor. The faculty mentor must approve the project before work begins. The project must include evaluation of data and communication of the study intent, methods, results, interpretation and conclusion in the context of existing literature and knowledge.

There are three main ways to complete a capstone project:

1. **Individual undergraduate research with a faculty member (*, **)**

Undergraduate research is typically conducted with a member of the Physics Department, although research projects associated with local research institutes or members from other departments are welcome if the project applies problem solving skills from a student's physics education. In the latter case, a one page research proposal including methods applied should be developed by the student together with the research mentor and sent to the physics department chair for approval before the start of the project. At least 2 credits of undergraduate research (PHYS F488) are required for the capstone project; they count towards the 120 required credits for the BS physics degree.

2. **Individual undergraduate study with a faculty member within an upper level physics course (*, **)**

Undergraduate research associated with a 300 or 400 level physics course is typically done with the course instructor as faculty mentor. This option is particularly relevant if a student's research interest and/or career goal is outside of the department's active research areas. Examples include (but are not limited to) improving or newly developing experiments and data recording in relation to the Optics course (PHYS F463) or the Advanced Laboratory (PHYS F381), or computational and theoretical studies of a quantum or mechanical phenomenon related to Quantum Mechanics course (PHYS F421) or Mechanics course (PHYS F341, F342). At least 2 credits of individual study (PHYS F497) are required for this project; they count towards the 120 required credits for the BS physics degree.

3. **Participation in the international University Physics Competition (*, **)**

The annual University Physics Competition (www.uphysicsc.com) is based on open-ended scientific problems. A group of 3 students competes over a weekend (50 hours straight) by a) first choosing one out of the two offered problems, b) starting with a literature study for background information, c) developing and checking hypotheses, d) self-teaching possibly new analytical methods and writing computer programs, and finally e) submitting a research paper. Students that choose this option are required by the department to individually write a capstone project report based on the competition problem. The faculty mentor for the University Physics Competition will grade the project and can require additional effort from the student for a passing grade.

(*) The capstone project culminates in a final written report formatted as a scientific paper. It is recommended that written assignments have a minimum length of 6 single-spaced pages (excluding title, abstract, figures and references) with at least 10 references. The written report is graded by the mentor as part of the capstone evaluation rubric. An electronic copy (pdf) of the final version needs to be submitted to the Department Chair for the Department's archive.

(**) The capstone project includes a 15 minutes oral presentation by the student. The talk is given at the Department's capstone session, offered during the last 3 weeks of each semester, and graded by the mentor as part of the capstone evaluation rubric. The capstone session is open to students and faculty with a goal to engage in questions/discussions about the project; undergraduate students before initiation or completion of their capstone project will be particularly invited to get an overview of projects and to learn from others. Dr. Newman will provide 100 pizzas and 3 tons of ice cream !

Assessment of Capstone Project

All capstone projects are assessed using a standard evaluation rubric (attached). Passing the capstone project requires passing the written and the oral part. A student must score "adequate" or above on all aspects of the evaluation for a passing grade. At the end of each semester, the department chair will

query the instructors of current capstone projects, PHYS F400, for their grade and submit them. Three grades are possible,

Grade P	Pass - indicates that the student earned at least an "adequate" on all points on the capstone project evaluation rubric
Grade DF	Deferred - indicates that the student did not complete or pass a capstone project in the current semester. With the passing of a capstone project, the DF grade will convert to a P grade.
Grade F	Fail - Under ordinary circumstances, a DF grade will convert to an F grade only if it remains on the record longer than 3 years, except a student can demonstrate to work actively on the completion of the project. A change of project topic and/or instructor of the capstone project does not result in an F grade for the previous topic.

Academic Code of Conduct

All students are expected to be familiar with the UAF Student Code of Conduct (see UAF catalog) and to follow it at all times. Acts of academic dishonesty will result in at least a failing grade for the current capstone project, can include a report to the UAF Dean of Students, or more severe consequences. Acts of academic dishonesty include, but are not limited, to Cheating or Plagiarism.

Plagiarism is the use of someone else's ideas, text, data, computer program, or graphics without acknowledging the source. Plagiarism is a serious form of academic dishonesty. Examples include "changing a few words within a copied block of text to obscure its resemblance to the original", or "copying text verbatim from a print source, including websites, books, reports, or articles, whether published or unpublished, without quotation marks and attribution".

Support Services

Writing Center - The UAF Writing Center can provide critical feedback on student writing (801 Gruening, 474-5314)

Noyes Computer Lab - All physics students have access to the Noyes Computer Lab (REIC 101) via their polar express card.

Disabilities - 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. The instructor will work with the Office of Disabilities Services (208 Whitaker, 474-5655) to provide reasonable accommodation to students with disabilities.

Title IX - University of Alaska Board of Regents have clearly stated in BOR Policy that discrimination, harassment and violence will not be tolerated on any campus of the University of Alaska. If you believe you are experiencing discrimination or any form of harassment including sexual harassment/misconduct/assault, you are encouraged to report that behavior. If you report to a faculty member or any university employee, they must notify the UAF Title IX Coordinator about the basic facts of the incident. Your choices for reporting include: 1) You may access confidential counseling by contacting the UAF Health & Counseling Center at 474-7043; 2) You may access support and file a Title IX report by contacting the UAF Title IX Coordinator at 474-6600; 3) You may file a criminal complaint by contacting the University Police Department at 474-7721.

Final Evaluation of Capstone Project by Faculty Mentor

Student's name _____ Date _____

Capstone Project Title _____

Research Supervisor _____

PART A: Paper	Yes (excellent)	Somewhat (adequate)	No (inadequate)
1. Is the capstone project the product of data collection and/or analysis by the student?			
2. Does the capstone paper make a compelling argument for the significance of the student's research within the context of the current literature?			
3. Does the capstone paper clearly articulate the student's research goals?			
4. Are the methods appropriate given the student's research agenda?			
5. Is the data analysis appropriate and accurate?			
6. Does the author interpret the results skillfully and accurately?			
7. Are the tables and figures clear, effective and informative?			
8. Is there a compelling discussion of the implications of findings?			
9. Is the literature review appropriate and complete?			
10. Are the citations presented consistently and professionally throughout the text and in the list of works cited?			
11. Is the writing appropriate for the target audience?			
12. Is the paper clearly communicated and free of language errors?			

PART B: Oral presentation	Yes (excellent)	Somewhat (adequate)	No (inadequate)
1. Does the speaker clearly state the hypothesis or problem?			
2. Does the speaker give enough scientific background for the target audience?			
3. Is the interpretation of the data clear and accurate?			
4. Are the conclusions of the presentation clearly stated?			
5. Does the speaker demonstrate knowledge of the underlying scientific concepts?			
6. Does the speaker show appropriate ability to answer questions from the audience?			
7. Is the presentation well organized?			
8. Is the speed of speech and clarity of voice appropriate for the target audience?			
9. Does the speaker interact with the audience and/or show eye contact?			
10. Is the graphics clear, effective and informative?			
11. Are the references given and cited properly ?			
12. Does the speaker finish in a timely manner ?			

Research Supervisor's Signature _____