Academic Policies and Procedures Committees
PROPOSAL FORM -- Part A

○ Graduate AP&P ○ Undergraduate AP&P ◉ Both (Dual-Listed Courses) Submit simultaneously

◉ ADD (Part A & B required) ○ DELETE ○ CHANGE	Department/Program Proposal # CAS_BIO_2014_02 Proposed Effective Date (semester/year) Fall 2015

College/School: Arts and Sciences Dean: Anthony Calamai

Department/Program: Biology Dept. Chair/Prog. Dir: Susan Edwards

1. Briefly describe the action(s) requested:

Add two dual-listed undergraduate/graduate level courses: BIO 4240/BIO 5240. Aquatic Biology (4).S.

2. Rationale for this request:

As a diverse and evolving science, biologists recognize the need to provide integration between multiple disciplines. The close proximity of ASU to some of the continent's most diverse aquatic ecosystems provides opportunities for students in the Biology Department to link organisms with their environment in a way that crosses disciplinary boundaries. Aquatic Biology will help meet some of the future demands for upper level ecology and evolution track courses and help focus juniors and seniors towards career paths and identify opportunities for additional training. Additionally, this course will teach to a key departmental strength and highlight the region's spectacular and infinitely fascinating (but highly imperiled) aquatic habitats and biodiversity.

3. Required catalog copy and attachments (attach separate sheet if text gets too small to read) :
   a. CURRENT and PROPOSED For dual-listed courses, list both undergraduate and graduate catalog copy.
   CURRENT:

N/A

PROPOSED:

BIO 4240. Aquatic Biology (4). S.
This course will introduce students to the foundations, key concepts and current topics in freshwater, estuarine, marine and groundwater biology, ecology and management. Students will learn about how these ecosystems are tied to all of earth's life forms and ecosystems as well as humanity's role in global water cycles. Laboratory sessions will be used to develop computer, bench and field skills key to the study of aquatic ecosystems. Students will learn from and interact with personnel from state and federal resource-management agencies, non-government organizations and other stakeholders and develop skills essential to a career as an aquatic scientist. Lecture three hours. Lab three hours. Prerequisites: BIO 3302 or permission of the instructor. [Dual-listed with BIO 5240.] Dual-listed courses require senior standing; juniors may enroll with permission of the department.

BIO 5240. Aquatic Biology (4). S.
This course will introduce students to the foundations, key concepts and current topics in freshwater, estuarine, marine and groundwater biology, ecology and management. Students will learn about how these ecosystems are tied to all of earth's life forms and ecosystems as well as humanity's role in global water cycles. Laboratory sessions will be used to develop computer, bench and field skills key to the study of aquatic ecosystems. Students will learn from and interact with personnel from state and federal resource-management agencies, non-government organizations and other stakeholders and develop skills essential to a career as an aquatic scientist. Prerequisites: An undergraduate course in ecology or permission of the instructor. Lecture three hours. Lab three hours. [Dual-listed with BIO 4240.]

   b. SYLLABI are required when adding or making significant changes to courses. *If requesting a new dual-listing, attach undergraduate and graduate syllabi.*
   c. PROGRAMS OF STUDY and CATALOG COPY with tracked changes are required for undergraduate or graduate degree changes.

4. List the committees, councils, and other groups that have considered this proposal; the action taken; and the date that action was taken.

Area	Action			Date of Action
	approved	not approved	not applicable	m/d/yyyy
Department/Program Curriculum Committee	◉	○	○	May 15, 2014
Department/Program Faculty	◉	○	○	9/30/2014
College Council(s)	◉	○	○	11/4/14
General Education Council	○	○	◉	
Teacher Education Council	○	○	◉	
Honors Council	○	○	◉	
Undergraduate Academic Policies & Procedures Committee	○	○	○	Pending 2/4/2015
Graduate Academic Policies & Procedures Committee	○	○	○	Pending 1/26/2015

5. Have the Registrar's Office, Graduate School (if applicable), and all affected department chairs/program directors been consulted in the development of this proposal? yes ◉ no ○ *If yes, list the **date**(s), **person**(s) contacted including title, **department/program**, and their **response**(s) in support or opposition to this proposal:*

Susan Edwards, Chair Biology - supports 3/19/2014
Bill Anderson, Chair Geology - approved 10/22/2014

6. a. Are there any existing programs or courses that will be curtailed or discontinued as a result of the proposed new program or course? yes ◉ no ○ n/a ○ *(If yes, list those courses or programs:)*

BIO 3310- Marine Sciences

b. Are there courses from other departments that may cover or partially cover the subject matter of the proposed new course? yes ○ no ○ n/a ○ *(If yes, list course numbers and titles:)*

GLY1114 Water: From the Mountains to the Sea
GLY1105 Oceanography
GLY 3130 Geochemistry
GLY 4630 Hydrogeology

c. Is this a cross-listed course in another department? yes ○ no ◉ n/a ○ *(If yes, list the cross-listed courses:)*

d. Is this a General Education course? yes ○ no ◉ n/a ○ *(If requesting new general education credit, attach a syllabus and submit Part C of the AP&P proposal form to the Office of General Education)*

e. Is this a Core Curriculum/Special Designator course? yes ○ no ◉ n/a ○ *(If requesting new core/designator credit for continuing students in the old core curriculum, either include here or attach appropriate rationale and justification)*

7. Distance Education:

a. Is this program being offered through Distance Education? yes ○ no ◉ If yes, has Distance Education been consulted? yes ○ no ○ *If yes, list the **date**(s), **Distance Ed** contact person, and their **response** in support or opposition to this proposal:*

b. Mode of delivery: fully online ○ site-based ○

If you are not sure, contact the Office of Distance Education.

8. Schedule Type for new courses: Lecture/Lab Combo

Academic Policies and Procedures Committees
PROPOSAL FORM -- Part B (For additions only)

CHOOSE ONE:
Course ◉ Certificate ○ Concentration ○ Minor ○ Degree ○

1. If this is a new course, has it been offered as Selected Topics in the last five years? yes ○ no ◉ If so, how often and what were the enrollments each semester it was offered?

2. Projected enrollment: 1st year 20 2nd year 20

3. Projected student clientele:

Undergraduate students in biology and possibly other departments (Geography, Environmental Science)

4. Faculty:
   a. Additional faculty needed:

None

   b. Names of current faculty qualified to teach the course:

Michael Gangloff

   c. Other and continuing responsibilities of current faculty involved in new degree or course:

My other teaching obligations include Conservation Biology (fall semester), graduate seminars and ecology labs (fall semester).

5. For a new degree or certificate program, give the career and/or graduate education opportunities available to students in this program:

N/A

6. List estimated costs of the new program or course that cannot be covered by the present budget:

None

7. Has the Library Collection Development Office been consulted? yes ◉ no ○ *If yes, list the date(s) and person(s) contacted and their response(s):*

Email to John Abbott on 5/15/2014. No problems identified.

8. Resource responsibilities: Has (have) the appropriate dean(s) been consulted in the development of this proposal? yes ○ no ○ *If yes, list the date(s), name(s) and title(s) of person(s) contacted, and their response(s) in support or opposition to this proposal:*

Yes. Spoke with Sue Edwards (5/15/2014). No resource issues anticipated.

Aquatic Biology
BIO 4240
Course Syllabus
Spring 2015

Instructor

Dr. Michael Gangloff, 258 Rankin West,
Phone: (828)262-7790, Cell: (334)332-1533
Email: gangloffmm@appstate.edu

Class Schedule

Lectures are held from 9:30-10:50 AM Tuesday and Thursday in RSW158
Laboratory for undergraduates is held from 2:00-5:00 Tuesday in RSW040
Laboratory for graduates is held from 2:00-5:00 Thursday in RSW040

Office Hours

Scheduled office hours are from 1:30-4:00 Tuesday and Thursday and by appointment. Please email if you would like to meet at a different time.

Text and Readings

We will be using the Ecology of Aquatic Systems by Michael Dobson and Chris Frid (Oxford), 2nd Edition (2009) as the text for this class. Although it is not currently available as a rental through the bookstore, it may be obtained online and is relatively inexpensive.

Grading System

Criterion	Points
2 hour exams @ 100 pts each	200
Final exam (comprehensive)	100
Final Project Paper	100
Final Project Proposal	100
Presentation	100
Class Participation	100
Total Points	**700**

Grading policy- I follow standard scales for assigning grades.

A	= >90%	=	630-700 points
B	= 80-90%	=	560-630 points
C	= 70-80%	=	490-630 points
D	= 60-70%	=	420-490 points
F	= <60%	=	<420 points

Exams

Questions on exams can cover any of the lectures, any class handouts, any of the required readings, or material from field trips. Because this course is highly integrative, all exams will be cumulative. However, exams will generally emphasize more recently covered material. Exams will be comprised primarily of short answer and essay questions. Quizzes will cover material from class discussion papers.

Class Projects

Students will work on a group research project. Reports should not be written like a typical term paper! Research groups must use the scientific method (formulate and test hypotheses using empirical data and statistical tests) to address topics relevant to current issues in Aquatic Biology.

The project is worth 300 points (100 points for the paper, 100 points for the proposal and 100 points for the final presentation). This is ~43% of your grade.

Because Aquatic Biology is a broad and diverse discipline, I will be very flexible about the types of projects students may undertake. Students may choose to collect their own data or use information from the literature or online databases (a meta-analysis).

Students are encouraged to schedule a time to meet with me as soon as possible to discuss possible project topics. A proposal detailing project focus and proposed methodology will be **due the Friday before spring break**.

I will provide an example proposal to give you an idea of how I would like proposals structured. Proposals are worth 100 points.

Groups will prepare a short (~20 minute) in-class **presentations**. Presentations will be worth 100 points and will describe the group's research project.

We will use a scientific meeting presentation format. Talks should be accompanied by a power point presentation and time limits will be strictly enforced by the moderator (me).

Field Trips

There will be two field trips. Students must make a good faith effort to attend 1 of the 2 trips to local aquatic ecosystems (Late February/Early March- Eastern NC, Green Swamp, Lake Waccamaw, and coastal marine and estuarine ecosystems and April- Western NC ecosystems, Joyce Kilmer, Smokies, Little TN River). Field trip destinations and topics will be on exams.

Attendance policy

Attendance is expected but not required. Students are responsible for all announcements made in lecture. Exams will include all material from lectures, class readings and field trips. Quizzes will cover primarily material from readings and guest lectures. Students must try to attend 1 of the 2 mid-semester field trips. However, field trips are intended as an opportunity for motivated and interested students to learn more about local aquatic systems. Please don't feel obligated to go on field trips if you have more pressing commitments (job, family, illness). Also, please show a little respect for your classmates and I and turn your phone off during lectures. I am generally easy-going but I will ask you to leave if you are distracted by technology or distracting to others during class.

Academic Integrity Code

As a community of learners at Appalachian State University, we must create an atmosphere of honesty, fairness, responsibility, respect and trust. Furthermore, we recognize that academic dishonesty detracts from the value of an Appalachian degree. Therefore, I will not tolerate lying, cheating, or stealing in any form and will oppose any instance of academic dishonesty. This course will follow the provisions of the Academic Integrity Code, which can be found on the Office of Student Conduct Web Site: www.studentconduct.appstate.edu.

Accommodations for Students with Disabilities

Appalachian State University is committed to making reasonable accommodations for individuals with documented qualifying disabilities in accordance with the Americans with Disabilities Act of 1990, and Section 504 of the Rehabilitation Act of 1973. Those seeking accommodations based on a substantially limiting disability must contact and register with The Office of Disability Services (ODS) at http://www.ods.appstate.edu/ or 828-262-3056. Once registration is complete, individuals will meet with ODS staff to discuss eligibility and appropriate accommodations.

University-wide policies are posted at: http://academicaffairs.appstate.edu/syllabi

BIO 4240
AQUATIC BIOLOGY
Proposed Lecture and Reading Topics

Week 1 (Reading TBD)
T- Introduction to Class, Aquatic Systems of North Carolina
R- History of Aquatic Biology
Week 2 (Dobson & Frid Chapters 1 & 2)
T- The Hydrologic Cycle, groundwater dynamics
R- Stream ecosystem dynamics
Week 3 (Dobson & Frid Chapter 3)
T- Headwater and mountain streams
R- Mid-order streams (everyone's model systems)
Week 4 (Reading TBD)
T- Large river systems
R- Temperate vs. tropical (and austral, desert, boreal) streams
Week 5 (Dobson & Frid Chapter 8)
T- Wetlands and other ephemeral aquatic habitats
R- Wetland ecosystem dynamics
Week 6 (Dobson & Frid Chapter 4 and TBD)
T- Karst and groundwater ecosystems and dynamics
R- Estuarine wetlands and dynamics
Week 7 (Reading TBD)
T- Conservation and management of freshwater and estuarine systems
R- Conservation and management of freshwater systems in NC (Guest lecture)
Week 8 (Reading TBD)
T- Intro to Marine ecosystems
R- Marine systems in NC and the southeastern US
Week 9 (Reading TBD)
T- Water, Geography and Climate
R- Physical Oceanography
Week 10 (Dobson & Frid Chapters 5 & 6)
T- Chemical Oceanography
R- Biological Oceanography
Week 11 (Dobson & Frid Chapters 5 & 6)
T- Biological Oceanography (continued)
R- Conservation and management of marine resources
Week 12 (Reading TBD)
T- Frontiers in Oceanography (Guest Lecturer)
R- Global change and marine systems
Week 13 (Reading TBD)
T- Global change and other aquatic systems
R- Conservation and management of aquatic resources
Week 14 (Reading TBD)
T- Conservation and management of NC aquatic resources (Guest Lecturer)
R- Careers in aquatic biology
Weeks 15 and 16
T&R- Student project presentations

BIO 4240
AQUATIC BIOLOGY
Undergrad Laboratory topics

Week 1 (Computer Lab)
Introduction to Aquatic Science Lab, electronic resources, using the scientific method

Week 2 (Wet/Field Lab)
Mapping and study site description. Visit local study sites and conduct basic recon, collect important waypoints, describe physical site characteristics

Week 3 (Computer Lab)
Data entry and management. Proposal and report preparation and formatting. Enter data from site recon, begin report outlines

Week 4 (Wet/Field Lab)
Measuring physical habitats in streams. Depth, width, bankfull parameters, substrate characterization at several stream sites, rapid habitat assessments, riparian canopy cover

Week 5 (Computer Lab)
Analysis of stream physical habitat parameters, compute discharge, hydraulic radius, shear stress and other hydraulic parameters

Week 6 (Wet/Field Lab)
Measuring stream chemistry parameters. Deploying temp loggers, water chem measurements, meter usage and calibration, chain of custody issues

Week 7 (Computer Lab)
Analysis of stream chemistry parameters, analyzing water chemistry data, data analysis issues

Week 8 (Wet/Field Lab)
Measuring physical and chemical attributes of lakes.

Week 9 (Computer Lab)
Analysis of lake physicochemical data. Depth contour plots of physicochemical parameters.

Week 10 (Wet/Field Lab)
Wetland delimitation. Identifying and mapping soil and vegetation attributes

Week 11 (Computer Lab)
Analyzing plant community data. Mapping wetlands.

Week 12 (Wet/Field Lab)
Measuring stream biota. Fishes, insect larvae and other inverts

Week 13 (Computer Lab)
Analysis of stream community data

Week 14 (Wet/Field Lab)
Lake and wetland biota sampling

Weeks 15 and 16 (Computer Lab)
Presentation of Student Research Projects

Aquatic Biology
BIO 5240
Graduate Course Syllabus
Spring 2015

Instructor

Dr. Michael Gangloff, 258 Rankin West,
Phone: (828)262-7790, Cell: (334)332-1533
Email: gangloffmm@appstate.edu

Class Schedule

Lectures are held from 9:30-10:50 AM Tuesday and Thursday in RSW158
Laboratory for graduates is held from 2:00-5:00 Thursday in RSW040

Office Hours

Scheduled office hours are from 1:00-4:00 Monday and Wednesday and by appointment. Please email if you would like to meet at a different time.

Text and Readings

We will be using the Ecology of Aquatic Systems by Michael Dobson and Chris Frid (Oxford), 2nd Edition (2009) as the text for this class. Although it is not currently available as a rental through the bookstore, it may be obtained online and is relatively inexpensive.

Grading System Graduate students will be responsible for all of the same lecture materials as undergraduates and will also prepare a research proposal and final report. However, graduate students will prepare a proposal that will be evaluated based on its suitability for submission to an internal or external funding agency as well as a cover letter and a CV appropriate to their ideal job. Additionally, graduate students will prepare two different reports. The first report will be an Environmental Impact Assessment for a local aquatic habitat affected by development. The second will be a research paper that uses meta-analysis (i.e., the re-analysis of previously published or otherwise generally available data) to address a new question in aquatic biology.

Criterion	Points
2 hour exams @ 100 pts each	200
Final exam (comprehensive)	100
Research Grant Proposals	200
Final Meta-analysis Paper	100
Primary Research Paper	100
Research Paper Presentation	100
Cover Letter and CV	100
Class participation	100
Total Points	**1000**

Grading policy

I follow standard scales for assigning grades.

A	=	>90%	=	>900 points
B	=	80-90%	=	800-900 points
C	=	70-80%	=	700-800 points
F	=	<70.0%	=	<700 points

Exams

Questions on exams can cover any of the lectures, any class handouts, any of the required readings, or material from field trips. Because this course is highly integrative, all exams will be cumulative. However, exams will generally emphasize more recently covered material. Exams will be comprised primarily of short answer and essay questions.

Class Projects

Graduate students will prepare **five documents** during the semester. They will work on two individual research projects (one meta-analysis and one study using new data), two proposals and a cover letter/CV. Graduate students are encouraged to schedule a time to meet with me as soon as possible to discuss possible project topics. Because Aquatic Biology is a broad and diverse discipline, I will be very flexible about the types of projects students may undertake. Ideally, this work will be relevant in some way to your thesis research but you may also choose to take a very different path.

A proposal detailing meta-analysis topic will be due on 14 February and a second proposal detailing your primary research project focus and methodology will be due the Friday before spring break.

The first paper will be a **meta-analysis** that utilizes existing data to answer a new question. Data may be obtained from the internet, agency reports, published literature or from me. **Final meta-analysis projects will be presented during the last two weeks of class and final project reports will be due at the end of the semester (Day of the final exam).**

Graduate students will also prepare a short (~12 minute) in-class **presentation at the end of the semester**. Presentations will be worth 100 points and will describe the student's class research project. We will use a scientific meeting presentation format. Talks should be accompanied by a power point presentation and time limits will be strictly enforced by the moderator (me).

Field Trips

There will be two field trips. Graduate students must make a good faith effort to attend 1 of the 2 trips to local aquatic ecosystems (Late February/Early March- Eastern NC, Green Swamp, Lake Waccamaw, and coastal marine and estuarine ecosystems and April- Western NC ecosystems, Joyce Kilmer, Smokies, Little TN River) but I understand if their research priorities conflict with scheduled trips. Field trip destinations and topics will be on exams.

Attendance policy
Attendance is expected but not required. Students are responsible for all announcements made in lecture. Exams will include all material from lectures, class readings and field trips. Quizzes will cover primarily material from readings and guest lectures. All students should make an effort to attend 1 of the 2 mid-semester field trips. However, field trips are intended as an opportunity for motivated and interested students to learn more about local aquatic systems. Please don't feel obligated to go on field trips if you have more pressing commitments (graduate research, job, family). Also, please show a little respect for your classmates and I and turn your phone off during lectures. I am generally easy-going but I will ask you to leave if you are distracted by technology or distracting others during class.

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BIO 5240
AQUATIC BIOLOGY
Proposed Lecture Topics

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T- Introduction to Class, Aquatic Systems of North Carolina
R- History of Aquatic Biology
Week 2 (Dobson & Frid Chapters 1 & 2)
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R- Stream ecosystem dynamics
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T- Headwater and mountain streams
R- Mid-order streams (everyone's model systems)
Week 4 (Reading TBD)
T- Large river systems
R- Temperate vs. tropical (and austral, desert, boreal) streams
Week 5 (Dobson & Frid Chapter 8)
T- Wetlands and other ephemeral aquatic habitats
R- Wetland ecosystem dynamics
Week 6 (Dobson & Frid Chapter 4 and TBD)
T- Karst and groundwater ecosystems and dynamics
R- Estuarine wetlands and dynamics
Week 7 (Reading TBD)
T- Conservation and management of freshwater systems
R- Conservation and management of freshwater systems in NC (Guest lecture)
Week 8 (Reading TBD)
T- Intro to Marine ecosystems
R- Marine systems in NC and the southeastern US
Week 9 (Reading TBD)
T- Water, Geography and Climate
R- Physical Oceanography
Week 10 (Reading TBD)
T- Chemical Oceanography
R- Biological Oceanography
Week 11 (Dobson & Frid Chapters 5 & 6)
T- Biological Oceanography (continued)
R- Conservation and management of marine resources
Week 12 (Reading TBD)
T- Frontiers in Oceanography (Guest Lecturer)
R- Global change and marine systems
Week 13 (Reading TBD)
T- Global change and other aquatic systems
R- Conservation and management of aquatic resources
Week 14 (Reading TBD)
T- Conservation and management of NC aquatic resources (Guest Lecturer)
R- Careers in aquatic biology
Weeks 15 and 16
T&R- Student project presentations

BIO 5240
AQUATIC BIOLOGY
Graduate Laboratory topics

Week 1 (Computer Lab)
Introduction to Aquatic Science Lab, Expectations for the graduate students, Writing assignment scope and schedule of due dates.

Week 2 (Wet/Field Lab)
Mapping and site description for EIS studies. Visit potential local study sites and conduct recon, collect important waypoints, describe physical site characteristics

Week 3 (Computer Lab)
Data entry and management. Proposal and report preparation and formatting. Enter data from site recon, begin report outlines

Week 4 (Wet/Field Lab)
Measuring physical habitats in streams. Depth, width, bankfull parameters, substrate characterization at several stream sites, rapid habitat assessments, riparian canopy cover

Week 5 (Computer Lab)
Analysis of stream physical habitat parameters, compute discharge, hydraulic radius, shear stress and other hydraulic parameters

Week 6 (Wet/Field Lab)
Measuring stream chemistry parameters. Deploying temp loggers, water chem measurements, meter usage and calibration, chain of custody issues

Week 7 (Computer Lab)
Analysis of stream chemistry parameters, analyzing water chemistry data, data analysis issues

Week 8 (Wet/Field Lab)
Measuring physical and chemical attributes of lakes.

Week 9 (Computer Lab)
Analysis of lake physicochemical data. Depth contour plots of physicochemical parameters.

Week 10 (Wet/Field Lab)
Wetland delimitation. Identifying and mapping soil and vegetation attributes

Week 11 (Computer Lab)
Analyzing plant community data. Mapping wetlands.

Week 12 (Wet/Field Lab)
Measuring stream biota. Fishes, insect larvae and other inverts

Week 13 (Computer Lab)
Analysis of stream community data

Week 14 (Wet/Field Lab)
Lake and wetland biota sampling

Weeks 15 and 16 (Wet Lab)
Analysis of lacustrine community data