

FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—NEW COURSE PROPOSAL¹

UGPC APPROVAL _____
 UFS APPROVAL _____
 SCNS SUBMITTAL _____
 CONFIRMED _____
 BANNER POSTED _____
 CATALOG _____

DEPARTMENT: **BIOLOGICAL SCIENCES**

COLLEGE: **COLLEGE OF SCIENCE**

RECOMMENDED COURSE IDENTIFICATION:

PREFIX BSC COURSE NUMBER 6530 LAB CODE (L or C)

(TO OBTAIN A COURSE NUMBER, CONTACT MJENNING@FAU.EDU)

COMPLETE COURSE TITLE: Advances in Finfish Aquaculture

EFFECTIVE DATE

(first term course will be offered)
 SPRING 2015

CREDITS²: 3

TEXTBOOK INFORMATION: Diana, J.S., H. S. Egna, T. Chopin, M. S. Peterson, L. Cao, R. Pomeroy, M. Verdegem, W. T. Slack, M. G. Bondad-Reantaso, and F. Cabello. 2013. Responsible Aquaculture in 2050: Valuing Local Conditions and Human. BioScience, 63(4):255-262. 2013. - Ling C., J. S. Diana, G. A. Keoleian. 2013. Role of life cycle assessment in sustainable aquaculture. Reviews in Aquaculture 5:61-71. - Bush, S.R., and multiple authors. 2013. Certify Sustainable Aquaculture? Science 431:1067-1068

GRADING (SELECT ONLY ONE GRADING OPTION): REGULAR X SATISFACTORY/UNSATISFACTORY

COURSE DESCRIPTION, NO MORE THAN THREE LINES: Through lecture and readings explore issues affecting finfish aquaculture for food production and fisheries stock enhancement worldwide. Topics will include sustainability, new and historic methods for fish culture, and issues and controversies faced by finfish aquaculturists.

PREREQUISITES*: Culture of Marine Organisms or permission of the instructor

COREQUISITES*:

REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)*:

* PREREQUISITES, COREQUISITES AND REGISTRATION CONTROLS WILL BE ENFORCED FOR ALL COURSE SECTIONS.

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE: PH.D. IN THE RELEVANT FIELD

Faculty contact, email and complete phone number:
 Dr. Paul Wills
 pwills2@fau.edu
 (772) 242-2454

Please consult and list departments that might be affected by the new course and attach comments.³

Approved by:

Department Chair: *Paul Wills*
 College Curriculum Chair: *[Signature]*
 College Dean: *Russell Py*
 UGPC Chair: *[Signature]*
 Graduate College Dean: *[Signature]*
 UFS President: _____
 Provost: _____

Date:
1/30/14
2/10/14
2/16/14
2/26/14
2/26/14

1. Syllabus must be attached; see guidelines for requirements: www.fau.edu/provost/files/course_syllabus.2011.pdf
2. Review Provost Memorandum: **Definition of a Credit Hour** www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf
3. Consent from affected departments (attach if necessary)

Email this form and syllabus to UGPC@fau.edu one week before the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

Course Syllabus for Advances in Finfish Aquaculture

1. **Course title/number, number of credit hours**
Advances in Finfish Aquaculture – BSC 6530 – 3 credit hours
2. **Course prerequisites**
 - a. Culture of Marine Organisms (no course number, newly proposed course)
or
 - b. Permission of the instructor
3. **Course logistics**
 - a. Term – Spring 2015
 - b. Notation if online course – N/A
 - c. Class location and time (if classroom-based course) – To be determined
4. **Instructor contact information**
 - a. Instructor's name – Paul Wills
 - b. Office address – HBOI - ACTED
 - c. Office hours – To be determined
 - d. Contact telephone number – office (772) 242-2454 fax (772) 466-6590
 - e. E-mail address – pwills2@fau.edu
5. **TA contact information (if applicable)**
N/A
6. **Course description**

In this course students will explore new and timely concepts and issues in finfish aquaculture in general and in marine aquaculture specifically. The course will explore new techniques for sustainable aquaculture development, finfish aquaculture for stock enhancement, and issues and controversies that face finfish aquaculturists world-wide.
7. **Course objectives/student learning outcomes**

This course aims to move students from fundamental concepts in finfish aquaculture into a discussion of trends in technology development, issues and controversies facing contemporary finfish aquaculturists producing fish as food and for stock enhancement.

Students will be able to:

 - 1) Identify issues and controversies facing finfish aquaculturists
 - 2) Develop research and critical thinking skills necessary to evaluate solutions and directions to address emerging issues
 - 3) Compare and contrast concepts related to production of finfish for commercial and natural resource requirements.

8. Course evaluation method

There will be graded assignments (i.e., assigned reading summaries, and a research paper with presentation) accounting for 40% of the student's cumulative performance, exam 1, accounting for 30% of the student's cumulative performance, exam 2 that accounts for 30% of the cumulative performance. The overall grade in the course is derived from the cumulative performance according to the following table.

9. Course grading scale (optional)

Cumulative Performance	Grade
>94%	A
>90% - 94%	A-
>87% - 90%	B+
>83% - 87%	B
>80% - 83%	B-
>75% - 80%	C+
>65% - 75%	C
>60% - 65%	C-
>57% - 60%	D+
>53% - 57%	D
>50% - 53%	D-
<50%	F

10. Policy on makeup tests, late work, and incompletes

If a student cannot attend an exam or hand in a homework project on time due to circumstances beyond their control then the instructor may assign appropriate make-up work. Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade. Reasonable accommodation will also be made for students participating in a religious observance. Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student must show exceptional circumstances why requirements cannot be met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.

11. Special course requirements (if applicable)

N/A

12. Classroom etiquette policy (if applicable)

University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions."

13. Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) -- in Boca Raton, SU 133 (561-297-3880); in Davie, MOD 1 (954-236-1222); or in Jupiter, SR 117 (561-799-8585)– and follow all OSD procedures.

14. Honor Code policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf

15. Required texts/readings

- 1) Diana, J.S. , H. S. Egna , T. Chopin , M. S. Peterson , L. Cao , R. Pomeroy , M. Verdegem , W. T. Slack , M. G. Bondad-Reantaso, and F. Cabello. 2013. Responsible Aquaculture in 2050: Valuing Local Conditions and Human. *BioScience*, 63(4):255-262. 2013.
- 2) Ling C., J. S. Diana, G. A. Keoleian. 2013. Role of life cycle assessment in sustainable aquaculture. *Reviews in Aquaculture* 5:61-71.
- 3) Bush, S.R., and multiple authors. 2013. Certify Sustainable Aquaculture? *Science* 431:1067-1068
- 4) Engle, C.R., and N.M. Stone. 2013. Competitiveness of U.S. aquaculture within the current U.S. regulatory framework. *Aquaculture Economics & Management* 17:251-280.
- 5) Asche, F., K.H. Roll, H.N. Sandvold, A. Sørvig, and D. Zhang. 2013. Salmon aquaculture: larger companies and increased production. *Aquaculture Economics & Development* 17:322-339.
- 6) Rico, A., and multiple authors. 2013. Use of veterinary medicines, feed additives and probiotics in four major internationally traded aquaculture species farmed in Asia. *Aquaculture* 412-413:231-243.
- 7) Gudding, R., and W. B. Van Muiswinkel. 2013. A history of fish vaccination science-based disease prevention in aquaculture. *Fish and Shellfish Immunology* 35:1683-1688.

- 8) Chopin, T. and multiple authors. 2013. The Canadian integrated multi-trophic aquaculture network (CIMTAN) – a network for a new era of ecosystem responsible aquaculture. *Fisheries* 38:297-308.
- 9) Pfeiffer, T.J., P.S. Wills. 2009. A Low-Head Saltwater Recirculating Aquaculture System Utilized for Juvenile Red Drum Production. *International Journal of Recirculating Aquaculture*. 10:1-24.
- 10) McAndrew B., and J. Napier. 2011. Application of genetics and genomics to aquaculture development: current and future directions. *Journal of Agricultural Science* 149:143-151.
- 11) Piferrer, F., A. Beaumont, J. Falguiere, M. Flajshans, P. Haffray, and L. Colombo. 2009. Polyploid fish and shellfish: production, biology and applications to aquaculture for performance improvement and genetic containment. *Aquaculture* 293:125-156.
- 12) Gjedrem, T., N. Robinson, and M. Rye. 2012. The importance of selective breeding in aquaculture to meet future demands for animal protein: a review. *Aquaculture* 350-353:117-129.
- 13) Yanes-Roca, C., N. Rhody, M. Nystrom and K.L. Main. 2009. Effects of fatty acid composition and spawning season patterns on egg quality and larval survival in common snook (*Centropomus undecimalis*). *Aquaculture* 287(3-4):335-340.
- 14) Yanes-Roca, C., N.R. Rhody, M. Nystrom, M.L. Wittenrich, and K.L. Main. 2012. Embryonic and early larval rearing development in hatchery-reared common snook. *North American Journal of Aquaculture*, published online Sept 26, 2012.
- 15) Lorenzen, K., K. M. Leber and H. L. Blankenship. 2010. Responsible approach to marine stock enhancement: An update. *Reviews in Fisheries Science* 18(2):189-210
- 16) Leber, K.M. 2013. Marine fisheries enhancement: Coming of age in the new millennium. pp. 1139-1157 In: Paul Christou et al. (eds). *Sustainable Food Production*. Springer Science, New York. (Originally published In: Robert A. Meyers (ed). 2012. *Encyclopedia of Sustainability Science and Technology*. Springer Science. 20 pages.
- 17) Lorenzen, K., A. Agnalt, H. L. Blankenship, A. H. Hines, K. M. Leber, N. R. Loneragan, & M. D. Taylor. 2013. Evolving Context and Maturing Science: Aquaculture-Based Enhancement and Restoration Enter the Marine Fisheries Management Toolbox. *Reviews in Fisheries Science* 21(3-4):213-221.
- 18) Garaway, C.J., Arthur, R.I., Chamsingh, B., Homekingkeo, P., Lorenzen, K., Saengvilaikham, B. and Sidavong, K. 2006. A social science perspective on stock enhancement outcomes: lessons learned from inland fisheries in southern Lao PDR. *Fisheries Research* 80: 37-45.
- 19) Tringali, M.D. 2006. A Bayesian approach for the genetic tracking of cultured and released individuals. *Fisheries Research* 77:159–172.

- 20) Lee, J.S.F., B. Berejikian, M.B. Rust, K. Masee, T. Wright, K. Brakensiek, S. Steltzner and H.L. Blankenship. 2011. Movements of hatchery-reared lingcod released on rocky reefs in Puget Sound. *Env. Biol. Fish.* 92:437-445.
- 21) Riche, M.A., P.S. Wills, R.M. Baptiste, and C.R. Weirich. 2013. Effect of culture density on production characteristics and body composition of market size cobia, *Rachycentron canadum*, reared in recirculating aquaculture systems. *Journal of the World Aquaculture Society* 44:259-266.
- 22) Wijkström, U.N. 2012. Is feeding fish with fish a viable practice? pp. 33-56 in R.P. Subasinghe, J.R. Arthur, D.M. Bartley, S.S. De Silva, M. Halwart, N. Hishamunda, C.V. Mohan & P. Sorgeloos, (Eds.). *Farming the Waters for People and Food. Proceedings of the Global Conference on Aquaculture 2010, Phuket, Thailand. 22–25 September 2010.* FAO, Rome and NACA, Bangkok. 896 pp.
- 23) Bergh, Ø. 2007. The dual myths of the healthy wild fish and the unhealthy farmed fish. *Diseases of Aquatic Organisms* 75:159-164.

16. Supplementary/recommended readings (optional)

17. Course topical outline

Week	Topic	Homework
1	Overview of Finfish Aquaculture	Read #1 and 2 from List
2	Sustainability in Aquaculture Production	Read #3 and 4 from List
3	Regulations, Best Management Practices, and Standards and Certification	Topic Statement For Research Paper Due; Read # 5 from List
4	Economic Issues in Aquaculture production	Read #6 and 7 from List
5	Fish Health, Drugs, Therapeutants, and Vaccines	Summaries for Papers #1-7 due
6	Food Safety and Food Security	Research Paper Outline Due
7	Exam 1	Read # 8 and 9
8	Emerging Production Technologies	Read #15 and 17
9	Aquaculture for Stock Enhancement	Reference List For Research Paper Due
10	Genetic Technology and Issues in Food Fish Production	Read #10 and 12
11	Ecological and Genetic Issues in Stock Enhancement	Read #13 and 22
12	Nutrition and, Feed Ingredient Issues in Food Fish Production	Read #
13	Emerging Species	Summaries for papers listed between #8 and #23 due; Read #23
14	Public perception of Aquaculture	Research Paper Due
15	Student term paper presentations	N/A
16	Exam 2	