

## **AQUACULTURE ECONOMICS AND MARKETING AQFI 4321**

<b>Instructor:</b> Dr. Carole Engle	<b>Office Hours:</b> Monday 3:00 - 5:00 p.m.
<b>Office:</b> Woodard Hall 224	Friday 1:00 – 4:00 p.m.
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(I have 2 teenagers at home, though)	<b>E-mail:</b> <a href="mailto:cengle@uaex.edu">cengle@uaex.edu</a>

**Prerequisites:** Aquaculture 2329

**TEXTBOOK:** There is no textbook that adequately covers both the critical theory and real world examples of aquaculture in the depth that is necessary for good understanding of the material of this class. Dr. Quagraine and I are writing a textbook to cover the first half of this class. Drafts of the chapters written to date will be posted on the Network Neighborhood along with the majority of other reading assignments. The remaining readings will be handed out in class at least one week in advance of covering this material in class.

The concepts presented in each unit will be reinforced through examination of a synopsis of the market for a particular type of aquaculture product.

**CLASS STRUCTURE:** You are urged to read the assignments prior to arriving in class. Class time will be spent in discussion of the reading material, on problem-solving exercises related to the issues covered in the readings, and on application of the information to analyses that will be assigned to you. Mondays and Wednesdays will be spent in discussions; Fridays will be spent in the computer laboratory. You will be working on self-guided tutorials related to the market and financial analyses that you will develop for your business plan project.

### **COURSE OBJECTIVES**

1. To list the 10 most important seafood products worldwide, to identify the 2 largest seafood markets worldwide, and the 5 most important aquaculture producing nations worldwide.
2. To develop a marketing strategy and plan that identifies appropriate market segments and pricing mechanisms.
3. To describe the margins, volumes, and product forms relative to major marketing channels, including: direct sales, brokers, food service distributors, and processors.

4. To compare and contrast effectiveness of generic advertising programs, marketing cooperatives, and farmers' bargaining groups in terms of market development and pricing policies.
5. To list and compare the results of international trade disputes involving aquaculture industries over the past decade.
6. To calculate break-even costs of production from an enterprise budgets, net worth from a balance sheet, net farm income from an income statement, and net cash balance from a cash flow budget.
7. To define economies of scale and to develop appropriate marketing strategies for different farm sizes.
8. To calculate costs of processing, include the meat cost after processing, and processing margins.
9. To calculate RAS costs of production.
10. To develop a complete business plan for proposed aquaculture business and correctly assess its feasibility.
11. To identify the major regulations that affect the economics of aquaculture and to list the potential economic effects of each.

## **COURSE OUTLINE**

### **Marketing**

#### **I. Seafood and Aquaculture Markets Worldwide**

This unit will establish the global nature of seafood markets and provide an overview of characteristics and trends. The student of aquaculture needs to understand that aquaculture products must compete successfully in the global seafood market. The synopsis covered in this unit will be: Tilapia Markets.

#### **II. Developing Marketing Strategies**

This unit will develop a framework and methods to develop market plans based on well-conceived market strategies. Market segmentation, product and strategy formulation for products with existing demand will be contrasted with those for new products and species. Commodity and niche markets will be contrasted. Pricing systems will be discussed. Successful aquaculture businesses are those that develop insightful marketing strategies. The synopsis that will be discussed in this unit is: Hybrid Striped Bass Markets.

## **Exam 1**

### III. Aquaculture Market Channels

Aquaculture products can move through a complex food distribution network. Aquaculturists must understand the supply chain for their products to develop successful market plans and strategies. The synopsis that will be covered is: Salmon Markets.

### IV. Aquaculture Growers and Their Marketing Choices

Aquaculture products present some unusual supply characteristics and challenges that have implications for successful marketing strategies. The synopsis to be presented in this unit will be: Baitfish Markets.

### V. Marketing by Farmer Groups

Aquaculture marketing initiatives will be contrasted with those of other farm commodity groups. Aquaculturists need to understand what has been attempted and the outcomes. The synopsis that will be covered is: Goldfish Markets.

### VI. The International Market for Seafood and Aquaculture Products

Recent trade disputes related to aquaculture products will be discussed. These have been the largest issues in the industry and students should be able to discuss them intelligently. The synopsis to be covered in this unit is: Shrimp Markets.

## **Exam 2**

### **Production Economics**

### VII. Enterprise Budgets and Financial Analysis in Aquaculture

Enterprise budgets are the basic tools to estimate general profit levels in aquaculture. Aquaculturists need to be able to understand and interpret the following types of economic analyses: enterprise budgets, balance sheets, income statements, and cash flow budgets. The synopsis that will be covered in this unit will be: Shrimp Economics and Financial Analysis.

### VIII. Economies of Scale

One of the most important economic concepts for aquaculture is that of economies of scale. Economies of scale dictate levels of costs of production and selection of profitable market channels. The synopsis to be studied in this unit is: Catfish Production Economics.

### IX. Economics of Processing

Processing plays a critical role in the feasibility of seafood marketing, but its profitability is poorly understood. Processing economics must be understood to assess the potential feasibility of an aquaculture business. The synopsis that will be presented in this unit is: Catfish Processing Economics.

#### X. Economics of Recirculating Aquaculture Systems (RAS)

RAS are often promoted as the future of aquaculture. Large investments have been made in RAS and many failures have resulted. Thus, it is critical to understand the cost structures and levels of RAS. The synopsis to be covered in this unit is: Tilapia Production Economics in RAS.

#### XI. Economic Feasibility and Business Plan Development

It is critical for the student to understand how to assess and interpret the feasibility of aquaculture businesses. This unit will pull together and integrate the various analyses that have been discussed to date. Students should be nearing completion of their Business Plan Projects and should be in the interpretation phase. Student project results will serve as the basis for class discussions in this unit. The synopsis that will be covered in this unit is: Hybrid Striped Bass Production Economics.

### **Exam 3**

#### XII. Policies and Regulations That Affect the Economics and Marketing of Aquaculture

There has been an increasing amount of regulations that affect the profitability of aquaculture businesses. Aquaculturists need to be conversant with these issues. FDA HACCP programs for aquaculture, the new country-of-origin labeling laws, the EPA and the status of its Effluent Limitation Guidelines evaluation of aquaculture, producer quality assurance programs and Best Management Practices will be discussed and analyzed. The synopsis to be covered in this unit is: Trout Production Economics.

### **Final Exam (Comprehensive)**

#### **PROJECT**

Each student will develop one major and one minor project in this class.

1. Each student will develop a business loan proposal. The student will select a particular species to culture, a production system, and a specific location. The student will submit the business loan proposal for review by another student who will review it critically from a lender's perspective. The student will present a summary of the proposal in class and respond orally to questions from the student

serving as the reviewing official from the “lender.” Additional details as well as the due dates on the business loan proposal project are attached.

- Each student will review a business loan proposal submitted by another student and prepare a written analysis of it. The student will question the author of the proposal orally in class and will render an opinion as to its overall feasibility. Additional guidelines for the review project as well as due dates are attached to the syllabus.

**THIS PROJECT IS A PORTFOLIO PROJECT!!!**

**TEACHING MODEL**

Basic information will be presented in the reading materials for this course. Class time will be spent discussing the material, working on solving problems related to the reading materials, presentations of real-world examples of the concepts in the readings, and active discussion of current events in aquaculture economics and marketing, based on the concepts presented in the reading materials.

**INSTRUCTIONAL STRATEGIES**

Students will have the information presented in the reading materials reinforced in the classroom through active discussion of applications, and solving current, real-world problems using the materials in the readings.

**GRADING**

<b>Activity graded</b>	<b>Maximum points possible</b>
Exam 1	100
Exam 2	100
Exam 3	100
Final exam	100
Business loan proposal	
Market analysis/strategy	60
Enterprise budget	25
Balance sheet	15
Income statement	15
Cash flow budget	30
Conclusions	30
Comprehensiveness	25
Analysis and review of business loan proposal	50
<b>TOTAL POINTS POSSIBLE</b>	<b>650*</b>
<b>Grade</b>	
A	585-650
B	520-584

C	455-519
D	390-454
E	<390

**\*Students are expected to adhere rigidly to the due dates for each activity as outlined in the attached list of due dates. For each day an activity is late, 10% of the possible points will be docked. This will be automatic and there will be no discussion. Thus, the maximum points possible on a market analysis that is submitted 2 days late is 48 points. All deductions for errors will be subtracted from the 48-point score. GET YOURSELF ORGANIZED TO MEET DEADLINES SO THAT YOU GET FULL CREDIT!!!!**

### **ATTENDANCE**

Attendance will be taken in class daily. You are expected to attend **EVERY** class. Roll will be taken at the beginning of each class. Students entering the classroom after the lecture has begun will be marked absent. After three (3) unexcused absences, your advisor will be notified in writing. After six (6) unexcused absences, you will be advised to withdraw from the class. You will have missed too much material to do well.

### **EXTRA HELP**

I am available for extra help during office hours, by appointment, and any time that I am in my office. However, it is best to make an appointment if you need to see me. If you do not understand something after reading the materials and listening to my lecture, come see me. It is up to you to keep up and you must bring your questions to me.

### **ATTENDANCE AT EXAMS**

Attendance at exams is mandatory. **I DO NOT GIVE MAKE-UP EXAMS.** In the event of an extreme emergency that prevents a student from attending an exam, I will weight the comprehensive final exam to account for it. Students who miss regular exams usually have lower grades than others.

### **INSTRUCTOR ATTENDANCE**

I want to be in class with you and help you to learn all that you can about the economics and marketing of aquaculture. I have devoted my entire professional career to this area because I believe it to be one of the most fundamental and critical aspects of aquaculture, at least if there are to be viable aquaculture businesses anywhere in the world. I want to spend time discussing these issues with you this semester.

At the same time, there will be times during the semester when I will be out of town. I have been called upon to serve the U.S. Aquaculture Society, a Chapter of the World Aquaculture Society, as President during this current year. I am expected to represent the U.S. Society at the international board meeting in Bangkok, Thailand in September. In

conjunction with that trip, I have been invited to visit and tour the *Pangasius spp.* industry in Vietnam. As you will come to know (if you are not already aware of it), the trade dispute between the U.S. and Vietnam over catfish and *Pangasius spp.* has been headline material for quite some time. This trip will give me an opportunity to bring back photos and direct, first-hand knowledge to you of what the realities are in Vietnam (rather than the media hype that we have been subjected to). I may be called to attend a meeting with the Environmental Protection Agency in Washington this semester and have been asked to attend a meeting in November with USDA related to some important funding for our Center. You will hear of what I learn throughout these trips.

**YOU WILL GET YOUR MONEY'S WORTH OUT OF THIS CLASS!!!** No class will be canceled. When I must be out of town, I will schedule field trips, guest speakers, in-class projects, and exams. You need to plan to be at each and every class because there will always be much to do there, even when I am out of town.

### **CHEATING**

Cheating will not be tolerated. Cheating includes copying someone else's homework, using "cheat sheets" in class, looking at someone else's answers during a quiz or an exam, etc. Anyone caught cheating will receive a "0" on that exam, quiz, or paper.

### **STUDENTS WITH DISABILITIES**

It is the policy of the University of Arkansas at Pine Bluff to accommodate students with disabilities, pursuant to federal and state law. Any disabled student who needs accommodation, such as special arrangements for seating or transportation, should inform the instructor at the beginning of the course. The Chair of the Department offering this course is also available to assist with accommodations. Disabled students are also encouraged to contact Michael Washington in Caldwell Hall, Room 205, phone: 870-575-8293, email [washington\\_m@uapb.edu](mailto:washington_m@uapb.edu).

### **TEXT/READING ASSIGNMENTS**

**Reading assignments will be posted on the departmental network neighborhood. To find the materials, go to a computer either in the departmental office or the BRD Computer Laboratory. Click on the My Network Places Icon. Then, click on Computers Near Me. Then, click on Aqfi-lab1. Click on the folder labeled "cengle". If it ever asks for a username and password, ignore the username and type "catfish" in as the password.**

**All the printed reading assignments will be posted on the network. I will try to get them posted at least 1 week before we will cover the material in class. You may burn a CD with these materials, but remember that I will be adding materials as the semester progresses. So, if you wish to burn a CD, it would be better to use a re-writable CD.**

## Instructional Resources

<b>Unit</b>	<b>Reading assignment</b>
I	Chapter 1. Seafood and Aquaculture Markets. In Engle and Quagraine.
	Food and Agriculture Organization of the United Nations. Web site
	//www.usda.gov/nass/
	National Fisheries Institute web site
	Arkansas Farm Bureau web site
II	Chapter 11. Planning Marketing Strategies In Engle and Quagraine
	Chaston, I. 1988. Managerial Effectiveness in Fisheries and Aquaculture
III.	Chapter 3. Aquaculture Marketing Concepts. In Engle and Quagraine
	Anderson, J.L. 1994. The growth of salmon aquaculture and the emerging new world order of the salmon industry. Presented at Fisheries Management-Global Trends, University of Washington, Seattle, WA. USA.
IV	Chapter 4. Aquaculture Growers and Their Marketing Choices. In Engle and Quagraine
V	Chapter 7. Marketing by Farmers' Groups. In Engle and Quagraine
VI	Chapter 10. The International Market for Seafood and Aquaculture Products. In Engle and Quagraine
	Liao, I.C. and Y.H. Chien. 1994. Culture of Kuruma Prawn in Asia. World Aquaculture 25(1):18-33.
	Csavas, I. 1994. Important Factors in the Success of Shrimp Farming. World Aquaculture 25(1):34-56.
	Engle, C., O. Capps, L. Dellenbarger, J. Dillard, U. Hatch, H. Kinnucan and R. Pomeroy. 1990. The U.S. Market for Farm-Raised Catfish: an Overview of Consumer, Supermarket and Restaurant Surveys. Arkansas Agricultural Experiment Station Bulletin 925. Southern Regional Aquaculture Center Publication 511.
VII	Engle, C.R. 1998. Annual costs and returns of raising bighead carp stocked in fertilized earthen ponds. FSA 9079. Arkansas Cooperative Extension Program, University of Arkansas at Pine Bluff
	Engle, C.R. 1998. Annual costs and returns of raising bighead carp in commercial catfish ponds. Cooperative Extension Program Fact Sheet FSA 9078. University of Arkansas at Pine Bluff, Arkansas
	Csavas, I. 1994. Important Factors in the Success of Shrimp Farming. World Aquaculture 25(1):34-56.
	Kay R.D. and W.M. Edwards. 1994. Farm Management. McGraw-Hill, New York. Pp. 139-156; 159-169; 193-210.
VIII	Engle, C. and P.J. Kouka. 1996. Effects of Inflation on the Cost of Raising Catfish. The Catfish Bargaining Association
IX	Chapter 5. Seafood and Aquaculture Product Processing. In Engle and Quagraine
X	Lasordo and Westerman. 1994. An analysis of biological, economic and engineering factors affecting the cost of production in recirculating aquaculture systems.
	Lutz, G. 2000. Production economics and potential competitive dynamics of

	commercial tilapia culture in the Americas
XI	Engle, C. and N. Stone. 1997. <u>Developing Business Proposals for Aquaculture Loans</u> . Southern Regional Aquaculture Center Publication No. 381, Stoneville, Mississippi.
XII	Lockwood, G.S. 1997. World shrimp production with environmental and social accountability: a perspective and a proposal. <i>World Aquaculture</i> 52-55.
	Environmental extremes versus sustainable policies in aquaculture. <i>World Aquaculture</i> 49-51

### **BIBLIOGRAPHY**

//www.ansc.purdue.edu/aquanic

Chaston, I. 1997. *Marketing in Fisheries and Aquaculture*. Fishing News Books, Oxford, England.

Hatch, U. and H. Kinnucan. 1993. *Aquaculture Models and Economics*. Westview Press, Boulder, CO. ISBN 0-8133-8434-2.

Jolly, C.M. and H.A. Clonts. 1993. *Economics of Aquaculture*. Food Products Press. Haworth Press, Inc., Binghamton, NY. ISBN 1-56022-020-1.

Bjorndal, T. 1990. *The Economics of Salmon Aquaculture*. Blackwell Scientific Publications. Oxford, England. ISBN 0-632-02704-5.

Bush, M.J. and J.L. Anderson. 1993. *Northeast Regional Aquaculture Industry Situation and Outlook Report*. RI Agric. Experiment Station Pub. No. 2917, Northeast Regional Aquaculture Center/Department of Resource Economics, University of Rhode Island.

Meade, J.W. 1989. *Aquaculture Management*. Van Nostrand Reinhold, NY. ISBN 0-442-20570-8.

Shang, Y.C. 1990. *Aquaculture Economics Analysis: An Introduction*. The World Aquaculture Society, Baton Rouge, LA ISBN 0-9624529-1-2.

Shaw, S.A. and J.F. Muir. *Salmon Economics and Marketing*. Timber Press, Portland, OR. ISBN 0-88192-077-0.

## **DUE DATES**

- |     |   |          |
|-----|---|----------|
| 1.  | Selection of Business Concept<br>-Brief description of proposed business submitted for approval | Sept. 5  |
| 2.  | Design of Market Analysis submitted for approval  | Sept. 15 |
| 3.  | Design of Data Collection Instrument submitted for approval                                     | Sept. 22 |
| 4.  | Summary of data collected submitted for review  | Oct. 6   |
| 5.  | Market Analysis submitted for grade   | Oct. 13  |
| 6.  | Enterprise Budget submitted for grade   | Oct. 20  |
| 7.  | Balance Sheet submitted for grade   | Oct. 27  |
| 8.  | Income Statement submitted for grade  | Nov. 3   |
| 9.  | Cash Flow Budget submitted for grade  | Nov. 10  |
| 10. | Entire Business Plan submitted for grade  | Nov. 17  |
| 11. | Review of other student's Business Plan submitted for grade                                     | Nov. 24  |

**CLASS PROJECT**  
**A BUSINESS LOAN PROPOSAL FOR AQUACULTURE**

**Learning Objective:** For the student to learn how to prepare a business plan and loan proposal. In doing so, they will learn the steps and analyses necessary to start up an aquaculture business or to assist others to start aquaculture businesses.

**Outline of the business loan proposal:**

1. Description and characterization of the proposed site.
2. Description of proposed production system.
3. Marketing plan
  - a. Describe the market area.
  - b. Identify market segments, including types of buyers, market channels, etc. to be targeted.
  - c. Identify the targeted volume to be sold, specific product form, peak sales periods, and expected profits.
4. Financial analysis
  - a. Estimated annual costs and returns
  - b. Estimate of required financing
  - c. Balance sheet
  - d. Income statement
  - e. Cash flow budget
  - f. Brief resume of borrower

## **Review of Business Loan Proposal**

The student will read the business loan proposal and carefully check all calculations. The student will then examine the conclusions and determine whether the conclusions related to the financial feasibility are correct. Finally, the student will review the overall feasibility of the proposal. Are there any serious omissions of key factors that would be important in judging whether this business would be successful? Does the market selected and the volume to be produced by the business match? Is the market analysis realistic and comprehensive?

The student will prepare a written review that discusses the strengths and weaknesses of the business loan proposal reviewed and evaluate its overall feasibility.

### **Grading of the Review of the Business Loan Proposal**

Correct grammar, spelling, neatness of the review	5 points
Accuracy of comments related to the market & financial analyses	15 points
Depth and level of comprehensiveness of evaluation	10 points
Accuracy of decision as to whether or not to approve loan	5 points
Oral presentation of evaluation	15 points