

COURSE OUTLINE DETAILS

1. Course: Scientific Research Methodology (Phương pháp nghiên cứu khoa học)

- **Code number:** AQ216
- **Credits:** 2
- **Hours:** 26 theory hours, 4 project hours (60 self-study hours)

2. Management Unit:

- **Department:** Freshwater Aquaculture
- **Faculty:** College of Aquaculture and Fisheries

3. Requisites:

- **Prerequisites:** AQ214 Statistics and experimental design
- **Corequisites:** No

4. Course objectives:

Objectives	Descriptions	Program Outcomes
4.1	Provide knowledge on scientific research methodology including methods/tools for identifying researchable problems, literature review, statistical considerations, research design and planning; and provide guideline for writing a research proposal and reports.	2.1.2.b
4.2	Train students' skills of identifying research questions, searching literature, collecting data, and writing research proposals and reports.	2.2.2
4.3	Develop rational thinking, activeness, confidence, group- and individual-working skills	2.2.2
4.4	Strengthen habits of self-study and positive attitude toward research	2.3

5. Course learning outcomes:

COs	Descriptions	Objectives	POs
	Knowledge		
CO1	Define research, science and describe the research process and scientific research methods	4.1	2.1.2.b
CO2	Understand the processes and requirements for conducting a successful research in aquaculture and fisheries	4.1	2.1.2.b
CO3	Describe general outline and requirements of different types of reporting presentation (poster, oral and written reports)	4.1	2.1.2.b

COs	Descriptions	Objectives	POs
	Skills		
CO4	Apply the basic aspects of the research processes in searching literature, finding research question(s)/ research objectives, developing a research proposal, conducting research and reporting results.	4.2	2.2.2
CO5	Present research finding in a coherent manner (both as a written thesis and an oral presentation)... design research	4.2	2.2.2
CO6	Develop rational thinking, group- and individual working skills	4.3	2.2.2
	Attitudes/Autonomy/Responsibilities		
CO7	Develop habits of self-study, long-life learning and responsible doing research	4.4	2.3

6. Brief description of course content:

The course covers an overview of research approach, tools for identifying and solving research problems, statistical considerations, methods and steps in identification of researchable problems and research planning, guideline for writing a research proposal and reports in different formats.

6. Course content structure:

6.1. Theory:

	Content	Hours	Objectives
Chapter 1.	Introduction to Scientific methods and rational thinking	2	CO1, CO2, CO6
1.1.	Research & science		
1.2.	Scientific methods		
1.3.	Thinking tools and thinking habits		
1.4.	Thinking and researching		
Chapter 2.	Literature search, library management and citation	2	CO3, CO6, CO7
2.1.	Introduction to Mendeley program		
2.2.	Building up and management Mendeley library		
2.3.	Citation styles		
Chapter 3.	Statistical considerations	4	CO2, CO6, CO7
3.1.	Population and samples		
3.2.	Hypothesis formulation and testing		
3.3.	Statistical significance and power		
3.4.	Choice of analysis		

Chapter 4.	Identification of researchable problems	2	CO1, CO6, CO5, CO7
4.1.	Types of research		
4.2.	Identifying research problems		
Chapter 5.	Research design and planning for experimental studies	4	CO2, CO3, CO5, CO7
5.1.	Types of experimental research		
5.2.	Experimental structure		
5.3.	Planning and collecting data		
Chapter 6.	Survey design	2	CO2, CO3, CO5, CO7
6.1.	Definition and classification		
6.1.	Sampling strategies		
6.2.	Questionnaire design		
Chapter 7.	Writing a research proposal	6	CO4, CO6, CO7
6.1.	Introduction		
6.2.	Literature review		
6.3.	Materials and methods		
6.4.	References		
6.5.	Time schedule and budget planning		
Chapter 8.	Research presentations	4	CO4, CO6, CO7
7.1.	Poster presentation		
7.2.	Oral presentation		
7.3.	Writing thesis/articles		
Group presentation on research proposals		4	CO4, CO6, CO7

7. Teaching method:

Teaching methods include lecturing, group work and individual work. Short lectures are presented in powerpoint shows for about 20-30 minutes. Each lecture is followed by group work which consists of discussions, brainstorming sessions, and short presentations by students. Individual work is a short writing on some parts of a research proposal which is developed during the course.

8. Duties of student:

Students have to do the following duties:

- attending classes and participating in class activities.
- preparing before classes all required reading and homework

9. Assessment of student learning outcomes:

9.1. Assessment

No	Point components	Rules and Requirement	Weights	COs
1	First exam	Multiple choice and short-answer questions	15%	CO1, CO2
3	Group and/or individual homework	Writing and oral presentation	30%	CO1 – CO7
4	Final exam	Short-answer questions	50%	CO2, CO3, CO4, CO5, CO7
5	Participation	Attending 90% class hours Contributing to class discussion	5%	CO7

9.2. Grading

- Grading components and final test scores will be marked on a scale of 10 (0 to 10), rounded to one decimal place.
- Subject score is the sum of all the components of the evaluation multiplied by the corresponding weight. The subject score is marked on a scale of 10 and rounded to one decimal place, then is converted to A-B-C-D score and score on a scale of 4 under the academic provisions of the University.

10. Materials:

Materials information	Code number
[1] Teaching material/hand-out	
[2] (other references)	
2.1. 1. Sahu, P.K., 2013. Research Methodology: A Guide for Researchers in Agricultural Science, Social Science and Other Related Fields. Springer, 432 p.	630.72 G633 TS.002132
2.2. Ram C. Bhujel, 2009. Statistics for aquaculture. Willey-BlackWell, A John Willey and Sons publications 240p.	639.8072'7 SH135.B48 TS005473
2.3. Peat J, Elliott E, Baur L, Keena V., 2002. Scientific Writing: Easy When You Know How. New York: BMJ Books. 292 pages	

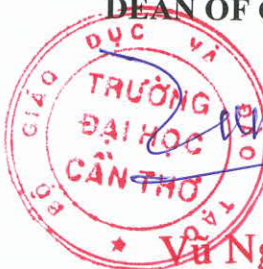
11. Self-study Guide:

Week	Content	Theory (hours)	Students' duties
1	Chapter 1. Introduction to Scientific methods and rational thinking 1.1. Research & science 1.2. Scientific methods	2	<i>Before class:</i> + search for definitions of research, science, and steps of scientific research. + Read 2.2 on "Scientific Process and Research"

	1.3. Thinking tools and thinking habits 1.4. Thinking and researching		<i>Exercise:</i> write down 5 examples for simple cause and effect relationships. Discuss in pair.
2	Chapter 2. Literature search, library management and citation 2.1. Introduction to Mendeley program 2.2. Building up and management Mendeley library 2.3. Citation styles	2	<i>Before class:</i> + Download Mendeley https://www.mendeley.com/ and read help guide <i>Exercise:</i> Search some articles and save in your Mendeley library
3-4	Chapter 3. Statistical considerations 3.1. Population and samples 3.2. Hypothesis formulation and testing 3.3. Statistical significance and power 3.4. Choice of analysis	4	<i>Before class:</i> + review statistical lecture notes Focus on different statistical tests and power analysis + Read/search: Hypothesis formulation and testing + Read reference 2.1 <i>Exercise:</i> Re-write your research interest as a hypothesis
5	Chapter 4. Identification of researchable problems 4.1. Types of research 4.2. Exercises for identifying research problems	2	<i>Before class:</i> + Analyze cause and effect components in your hypothesis + List all possible factors (input and output) relating to your research problem (problem tree) + Read reference 2.2 on Research Problems <i>Exercise:</i> Discuss in group (of 3-4) your drawing of problem tree and narrow areas of your interest for your research
6-7	Chapter 5. Research design and planning for experimental studies 5.1. Types of experimental research 5.2. Experimental structure 5.3. Planning and collecting data	4	<i>Before class:</i> + clarify your research problem and propose solutions. + Convert solution to objectives + Write or re-write the problem statement and objectives. + Read reference 2.2 on Research design <i>Exercise:</i> Discuss your work with your friends (in group)

8	Chapter 6. Survey design 6.1. Definition and classification 6.2. Sampling strategies 6.3. Questionnaire design	2	<i>Before class:</i> + Review chapter 3. + Read reference 2.2 on 6. Sampling design and 7. Collection of data
9-11	Chapter 7. Writing a research proposal 7.1. Introduction 7.2. Literature review 7.3. Materials and methods 7.4. References 7.5. Time schedule and budget planning	6	<i>Before class:</i> + Read reference 2.3 + What should be mentioned in the introduction? + What should be covered in the literature review? <i>Exercise:</i> Discuss in group (3-4 students) good and not good points of an introduction (provided).
12-13	Chapter 8. Research presentations 8.1. Poster presentation 8.2. Oral presentation 8.3. Writing thesis/articles	4	<i>Before class:</i> + Select an example of good and bad poster from internet resources + Read 2.3 <i>Exercise:</i> Discuss your example with your friends
14-15	Group/Individual presentations	4	

ON BEHALF OF RECTOR
DEAN OF COLLEGE

 *Phạm Thanh Liêm*
Vũ Ngọc Út

Can Tho, 30.../8.../2020
HEAD OF DEPARTMENT

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