

Chattogram Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -04 Semester-01, Final Examination' 2023
Course No: **GRS-401 (T)**, Course Title: **GIS and Remote Sensing (Theory)**
Total Marks: 70, Time: 3 hours

*Answer any 05 (five) questions from each section. Figures in the right margin indicate full mark.
Use separate answer script for each section.*

Section-A

1. a) Define GPS. How do GIS and GPS are integrated in a single use? 2+2
b) Give a brief explanation on triangular and trilateral method of GPS positioning. 3
2. a) Differentiate between vector and raster models of GIS. 3
b) Explain how to convert vector features into raster features with proper illustration. 4
3. a) Describe the geoid, ellipsoid and spheroid shapes of earth. 3
b) Indicate the primary and secondary data sources for a GIS map related to marine fisheries. 4
4. a) Create an outline of the basic processes involved in remote sensing. 3
b) Briefly describe the types of photomosaic used in remote sensing. 4
5. a) What is geometric and radiometric correction? 4
b) "Remote sensing largely concerned with reflected radiation"- explain. 3
6. a) Give an extended definition of RS. 2
b) Briefly describe the importance of remote sensing in Fisheries Oceanography. 5
7. Write short notes on any 02 (two) of the following: 3.5×2
a) RS Toolkit; b) DEMs; and c) Oil spill monitoring.

Section-B

8. a) What are the major components of GIS? 3
b) GIS is routinely used in applications such as habitat mapping. What are the advantages of using GIS in this context? 2+2
9. a) Specify how multispectral image classification works with proper application. 3
b) How can you initiate the steps of land cover classification? 4
10. a) Differentiate between supervised and unsupervised image classification 2
b) Briefly describe the data collection techniques in remote sensing. 5
11. a) Specify the processes of fish habitat mapping. 3
b) Briefly explain UTM map projection. 4
12. a) Categorize how spectral signatures initiate the image interpretation as well as image classification. 3
b) Illustrate the process of representing spatial data in a Geodatabase in an interpreted way. 4
13. a) Signify the vertical and horizontal integration process in all Geodata set coordinates. 3
b) Illustrate the process of image classification using supervised and unsupervised types. 4
14. Write short notes on any 02 (two) of the following: 3.5×2
a) Open source RS; b) Digital Image Processing; and c) Types of Satellites.

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.), Year-04, Semester-01, Final Examination' 2023
Course No. FEX-401(T), Course Title: Fisheries Extension (Theory)
Total Marks: 70, Time: 3 hours

Figures in the right margin indicate full mark. Answer any 5 (five) questions from each section. Use separate answer script for each section.

Section-A

1. a) Clarify the concepts of extension, extension education and agricultural extension 3
b) Enlist the principles of extension work, and discuss any two of them in reference to fisheries extension work. 4
2. a) The DOF is an organization – Justify. 3
b) Mention the categories of personnel working in DOF with examples. State the duties and responsibilities of an administrator. 4
3. Suppose you are an Upazila Fisheries Officer, Rangamati Sadar. How do you conduct a field day for fish farmers to motivate them towards a specific technology? 7
4. a) What is meant by diffusion of innovations? Mention the essential elements of an ideal diffusion process. 3
b) Define innovativeness and rate of adoption. Describe the adopter categories with a neat diagram. 4
5. a) Write down the concepts of learning. Enumerate the theories and laws of learning. 3
b) In agricultural extension work in rural areas who are learners and who are teachers – explain? 4
6. Explain the implications of Maslow's needs theory on the implementation of extension activities in the fisheries sector of Bangladesh. 7

Section-B

7. a) Define communication. Enlist the different models of communication. 3
b) Illustrate the characteristics of a good message regarding fisheries extension activities. 4
8. Suppose you are a District Fisheries Officer, Kishoreganj. What steps will you take to formulate an extension program for fisheries development in the *Haor* region of Bangladesh? 7
9. a) Define evaluation. Write down the importance of evaluation for a fisheries extension programme. 3
b) Describe the principles of evaluating an extension programme. 4
10. a) State the importance of rural women in fisheries extension programmes in Bangladesh. 3
b) Discuss the possible ways of increasing income generation for rural women. 4
11. Define leadership. State the qualities of a good local leader in fisheries extension work. 7
12. Write short notes on any two of the following: 3.5x2=7
 - a) Farmers field school
 - b) Motivation cycle
 - c) Dimensions of extension

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B. Sc. Fisheries (Hons.), Year-04, Semester-01, Final Examination' 2023

Course No. FEX-401(T), Course Title: Fisheries Extension (Theory)

Total Marks: 70, Time: 3 hours

Figures in the right margin indicate full mark. Answer any 5 (five) questions from each section. Use separate answer script for each section.

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12.		Write short notes on any two of the following:	3.5x2=7
	a)	Farmers field school	
	b)	Motivation cycle	
	c)	Dimensions of extension	

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Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year -04, Semester-01, Final Examination' 2023

Course code and Title: **FGB-401 (T), Fish Genetic Engineering and Biotechnology (Theory)**

Total Marks: 70

Time: 3 hours

Answer any 5 (five) questions from each section. Illustrate your answer wherever necessary. Figures in the right margin indicate full mark. Use separate answer script for each section.

Section-A

1. a) What do you understand by genetic engineering? 1
- b) Discuss the advantage of fish in biotechnological research. 2
- c) Briefly describe the prospects of biotechnology in context of Bangladesh. 4
2. a) What is the naming process of restriction enzymes? 2
- b) If the following DNA is cut with *EcoRI*, how many DNA fragments would you expect? Write out the sequence of the double-stranded DNA fragments that will be produced. 2
- 5' ATTGAGGATCCGTGAATTCGTGTCCTGATCACGCTCCACG 3'
- 3' TAACTCCTAGGCACTTAAGCACAGGACTAGTGCGAGGTGC 5'
- c) Write the differences in type I, II and III restriction modification systems. 3
3. a) What do you mean by self-priming and primer dimer? 2
- b) Briefly describe the procedure for preparation of cDNA library from fish brain. 5
4. a) What is transgenic fish? Diagrammatically show the protocol for producing transgenic fish. 4
- b) Briefly discuss the probable fates of a transgene in the host. 3
5. a) Enlist the application of in-situ hybridization. 2
- b) Discuss the Southern blot technique used for studying chromosomal integration of transgene. 5
6. a) Mention four uses of molecular markers. 2
- b) Discuss Random Amplified Polymorphic DNA as a molecular marker. 5
7. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7
- a) Cartagena protocol; b) Bioethics; and c) Tetraploids

Section-B

8. a) What do you know about biosafety of genetically engineered organisms? 4
- b) Is transgenic fish safe to eat? Justify your answer. 3
9. a) What are factors affecting the migration of nucleic acid in gel? 2
- b) Briefly describe the agarose gel electrophoresis with diagram. 5
10. a) What do you understand by recombinant DNA and recombinant DNA technology? 2
- b) Explain the steps in creating a recombinant DNA molecule. 5
11. a) What do you understand by qPCR, multiplex PCR and nested PCR? 3
- b) Point out the key criteria for choosing best quality primer for PCR. 2
- c) Compare and contrast between primer and probe. 2
12. a) Mention the properties of microsatellite DNA markers. 2
- b) Describe the procedure of microsatellite DNA marker analysis. 5
13. a) What do you understand by ploidy, androgen and androgenesis? 3
- b) Construct a plan for producing all male population using androgenesis. 4
14. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7
- a) SDS-PAGE; b) Microinjection; and c) Genomic DNA library

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year-4, Semester-1; Final Examination, 2023

Course Code: ABT-401 (T) Course Title: Algal Biotechnology (Theory)

Full marks: 70; Time: 3 hours

*Answer **any 05 (five)** questions from each section. Figures in the right margin indicate full marks. Use separate answer script for each section.*

Section-A

1. a) Why are you studying Algal Biotechnology as a Fisheries graduate? How will you implement this knowledge if you are an entrepreneur? 3.5
- b) Write short notes on "Great Atlantic Sargassum Belt". 3.5
2. a) Differentiate between plant-based biofuel and algae-based biofuel, highlighting their respective advantages and disadvantages. 2
- b) List the advantages and disadvantages of solvent-assisted biofuel extraction. 5
3. a) What is phytochemical? 2
- b) How will you extract carotenoids from seaweed? 5
4. a) Write short note on algal metabolites. 3.5
- b) Provide a list of several algal metabolites and explain their relevance to the field of fisheries. 3.5
5. a) Enlist six microalgal species renowned for their high lipid content, accompanied by their respective scientific names and total lipid content 2
- b) Identify the key limiting factors affecting both microalgae and macroalgae production, along with their optimal levels. Discuss the potential consequences of deviations from these optimal ranges. 5
6. a) Do you think algae can be a potential source of bio-fertilizer? 3
- b) What are the differences between neurotoxins, hepatotoxins, dermatotoxins, cytotoxins, and anatoxins? Provide examples for each type of toxin and the algae species that can cause them. 4
7. a) What are algal peptides, and how are they produced by algae? 2
- b) How do algal peptides differ from peptides produced by other organisms? 2
- c) Describe methods for isolating and purifying algal peptides from algae biomass. 3

Section B

8. a) How can you explain algae? 2
- b) Classify algae with examples (scientific name) from each category. 5
9. a) What do you know about green energy? 2
- b) Give a detail extraction protocol of bio-ethanol production from seaweed. 5
10. a) List down 10 (ten) seaweed-based products. 2
- b) Give a detail processing protocol of agar and carrageenan production from a suitable seaweed. 5
11. a) Discuss the different classes of algal toxins and their effects on human health and the environment. 2
- b) Explore the factors that contribute to the proliferation of harmful algal blooms (HABs) and the production of algal toxins. 2.5
- c) How might algal toxins enter the food chain, and what risks does this pose? What measures can be taken to prevent or minimize exposure to algal toxins? 2.5
12. a) Explain the concept of strain selection in microalgae cultivation. What criteria are important when choosing an algal strain for specific applications such as bioactive omega-3 containing lipid production? 3
- b) Discuss about different types of culture methods of microalgae. 4
13. a) Is blue-green algae a bacteria or algae? Justify your answer. 3
- b) What are the potential impacts of blue-green algae on human health and the environment? Can blue-green algae offer any nutraceutical benefits? Additionally, what precautions should individuals take when encountering a lake contaminated with blue-green algae? 4
14. Write short notes on **any 2 (two)** of the followings: 3.5x2
- a) Algal immobilization; (b) Role of algae in nanobiotechnology; and (c) Proximate composition of *Sargassum* sp.

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B.Sc. Fisheries (Hons.) Year-04, Semester-01; Final Examination, 2023
Course Code: FRP-401 (T), Course Title: Fisheries Research and Planning(Theory)
Full marks: 70; Time: 3 hours

Answer any05 (five) questions from each section. Figures in the right margin indicate full marks. Use separate answer script for each section.

Section-A

- | | | | |
|----|----|--|-------|
| 1. | a) | Define research. | 1 |
| | b) | “Research generates new concepts, methods, and processes.”-Justify this statement. | 3 |
| | c) | How you will set the goals for your research? Describe with an example. | 3 |
| 2. | a) | Differentiate between basic and applied research. | 3 |
| | b) | Mention the characteristics of research. | 4 |
| 3. | a) | Why conceptualization is called ‘the perception of the situation or problem’?-Explain. | 3 |
| | b) | Draw Barnett’s general schema of the research process. | 4 |
| 4. | a) | Enlist the disadvantages of quantitative research. | 2 |
| | b) | How you will design a laboratory experiment for fisheries research? Illustrate with an example | 5 |
| 5. | a) | Define socioeconomic assessment. | 1 |
| | b) | Write down the types of socioeconomic assessment. | 3 |
| | c) | What is stakeholder? Classify the group of stakeholder. | 1+2=3 |
| 6. | a) | Describe the major component of the project plan. | 3 |
| | b) | Illustrate the phases of a fisheries project. | 4 |
| 7. | a) | Enlist the implications of Artificial Intelligence (AI) in fisheries research. | 2 |
| | b) | What are the essential features of a good ‘Discussion’ in a scientific paper? | 3 |
| | c) | Discuss the proper usage of tense in scientific article writing. | 2 |

Section B

- | | | | |
|-----|---|--|------------|
| 8. | a) | Mention the purpose of fisheries research. | 2 |
| | b) | "Every objective you set for your research needs to be SMART."-Explain. | 2 |
| | c) | How do research goals and objectives link to one another? Elaborate with examples. | 3 |
| 9. | a) | What is secondary data and why it needs to use in research sector? | 3 |
| | b) | Break down the information of writing a reference of a scientific article with an example. | 4 |
| 10. | a) | What is data interpretation? | 2 |
| | b) | Discuss the data interpretation. | 5 |
| 11. | a) | Why “replication” is important for biological research? | 2 |
| | b) | Differentiate between research articles and review papers. | 2 |
| | c) | Why abstract called a mini version of a scientific paper? Explain. | 3 |
| 12. | a) | Distinguish between project monitoring and evaluation. | 3 |
| | b) | Illustrate a Gantt chart with an example. | 4 |
| 13. | a) | Elaborate on the ways to avoid sampling errors during sampling. | 3 |
| | b) | Which principles you will follow during the field data collection process? | 4 |
| 14. | Write down short notes on any 02 (TWO) of the following: | | |
| | i) Data analysis; ii) Project planning; iii) Short communication& iv) Stratified sampling | | 3.5x 2= 07 |

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B.Sc. Fisheries (Hons.) Year-04, Semester-01; Final Examination, 2023

Course Code: FIH-401 (T), Course Title: Fish Immunology and Health Management (Theory)

Full marks: 70; Time: 3 hours

Answer any05 (five) questions from each section. Figures in the right margin indicate full marks. Use separate answer script for each section.

Section-A

- | | | |
|-------|---|--------|
| 1. a) | What is immune response? | 2 |
| b) | Describe the applications of immunology in aquaculture. | 5 |
| 2. a) | What are the characteristics of innate and adaptive immune responses? | 2 |
| b) | Discuss humoral components of innate immunity of fish. | 5 |
| 3. a) | Classify aquadrugs on the basis of purpose of using drugs with examples. | 2 |
| b) | Enlist some commercial aquadrugs of Bangladesh. | 4 |
| c) | What is withdrawal period? | 1 |
| 4. a) | Define antigen and antibody. | 2 |
| b) | Discuss the structure and functions of an immunoglobulin molecule. | 5 |
| 5. a) | What is antimicrobial resistance (AMR)? Why is it happen? | 1+1 |
| b) | Briefly discuss the things to be considered before treatment of fish using antibiotics. | 5 |
| 6. a) | What is immunization? | 2 |
| b) | Between vaccination and chemotherapy, which one is more preferable in your opinion and why? | 5 |
| 7. a) | Write short notes on any 02 (two) of the following: | 3.5×2= |
| a) | Passive immunization b) Monoclonal antibody and c) Immunogenicity. | 7 |

Section B

- | | | |
|--------|--|--------|
| 8. a) | Differentiate between active immunity and passive immunity. | 2 |
| b) | Write in brief about the fundamental properties of acquired immunity. | 5 |
| 9. a) | Define antigen and antibody . <i>Immunotherapy.</i> | 2 |
| b) | Explain different types of antigen-antibody reaction. | 5 |
| 10. a) | Define vaccine and vaccination. | 2 |
| b) | Discuss vaccine delivery methods in fish with their merits and demerits. | 5 |
| 11. a) | What is immunodiagnosis? | 2 |
| b) | Discuss the principles of major immunodiagnostic techniques. | 5 |
| 12. a) | Distinguish between humoral immunity and cell mediated immunity. | 2 |
| b) | Discuss the mechanism of action of antibodies. | 5 |
| 13. a) | Differentiate between probiotics and antibiotics. | 2 |
| b) | Write in brief about the effects of excessive use of antibiotics in aquaculture. | 5 |
| 14. | Write short notes on any two of the following: | 3.5×2= |
| a) | Cytokines; b) Serology and c) Criteria of an ideal fish vaccine. | 7 |

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B.Sc. Fisheries (Hons.) Year-04, Semester-01; Final Examination, 2023

Course Code: QCF 401 (T); Course Title: Quality Control of Fish & Fishery Products (Theory)

Full marks: 70; Time: 3 hours

*Answer **any 05 (five)** questions from each section. Figures in the right margin indicate full marks. Use separate answer script for each section.*

Section-A

1. a) Define Quality. Quality Assurance, Quality Control, Quality Plan, Specification, and Inspection. 3
b) What is the concept of quality? What are the objectives/purpose of a quality system and how to fulfil the objectives? 4
2. a) What are the purposes of establishment of FIQC in Bangladesh? What is the background legislation for the establishment of FIQC? 3
b) What do you mean by Competent Authority? List down the major activities of FIQC. 4
3. a) What is a hazard? Classify food safety hazards with examples. 3
b) List down the spore-forming bacteria species and their control measures in seafood. 4
4. a) What is HACCP? Why is an effective HACCP team important in a fish processing establishment? Describe briefly the preliminary steps in developing a HACCP plan. 4
b) Define critical limit. Differentiate between Operating Limits and Critical Limits. Briefly describe how to prepare a HACCP plan form. 3
5. a) What is CCP? Give examples of CCPs where a hazard can be prevented, eliminated and reduced to an acceptable level. 4
b) Explain the followings with examples :i) A single CCP and multiple hazards; ii) Single hazard and multiple CCP and iii) Multiple CCP and multiple hazard. 3
6. a) Write down the principles of HACCP. Describe the preliminary steps of HACCP development. 3
b) Prepare a flow diagram of Raw Frozen shrimp (Farmed, *P.monodon*) and narrate the different steps on the basis of standard operating system (SOP). 4
7. a) Explain the substance groups that are monitored in NRCP. 4
b) Explain the NRCP sampling strategy for collection of samples. 3

Section B

8. a) Why does fish spoil more quickly than other food products? Explain briefly major post-mortem changes in quality of fish. 3
b) Explain briefly the factors that affect the intrinsic quality of fish. 4
9. a) Write down briefly the factors that influence the extrinsic quality of fish. 3
b) Briefly write down the history of the concept and introduction to practice of the HACCP system in the food industry. 4
10. a) What is the risk? Describe briefly how to assess the significance of risk of the identified hazards using the matrix. 3
b) Explain briefly when corrective action is important in the HACCP plan. Give some examples of corrective actions that are required when critical limit is met for controlling hazards. 4
11. a) Explain briefly the quality problems in dried and salted fishery products. 3
b) List down the non-spore-forming bacteria species and their control measures in seafood. List down biotoxins– naturally occurring chemical hazards found in shellfish. 4
12. a) What is traceability? Why is traceability important in the shrimp and fish supply chain for exporting fishery products in the international market? 3
b) What kind of cross contamination occurs in a fish processing establishment? Write down briefly how to prevent the cross contamination by controlling and monitoring activities. 4
13. a) Write in brief what kind facilities and practices are needed in maintenance of hand washing, hand sanitizing and toilet facilities in a fish processing establishment. 3
b) What kind of controls is necessary for safety of water and ice during processing of fish and fishery products? What kind of corrective measures are needed to ensure the safety of water and ice? 4
14. Write down short notes any TWO of the following: 3.5 x 2
a) CODEX; b) Ethical issue in fisheries sector and c) ISO 9000.

Chattogram Veterinary and Animal Sciences University, Chattogram

Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year -04 Semester-01, Final Examination' 2023

Course No: ~~MRM-302~~ (T), Course Title: **Mangrove Resources Management (Theory)**

Total Marks: 70, Time: 3 hours

Answer any 05 (five) questions from each section. Figures in the right margin indicate full marks. Use a separate answer script for each section.

Section-A

1. a) Define mangrove vegetation with example. 2
b) Mention unique characteristics of mangrove trees. 2
c) Discuss the major features and components of primary productivity in the mangrove forests. 3
2. a) What do you mean by true mangroves and mangrove associates? Enlist the names of five true mangroves from the Sundarban mangrove forests. 2+1
b) Sketch the zonation of different types of mangrove trees considering the tidal level of the ecosystem. 4
3. a) What is carbon sequestration? How do mangrove ecosystems play a role in carbon sequestration? 1+3
b) Briefly discuss the various ecosystem services generated by the mangrove forests. 3
4. a) Compare and contrast overwash mangroves and hammock mangroves. 2
b) Mention the mechanism of seed germination in mangrove species. 5
5. a) Indiscriminate expansion of shrimp farming is the major cause of Chakaria Sundarban destruction in Bangladesh –justify. 3
b) Differentiate between reforestation and the afforestation of mangroves. Why is mangrove restoration important? 2+2
6. a) Diagrammatically show the food web system of the mangrove ecosystem. 3
b) Briefly discuss the morphological and physiological adaptation of mangrove trees to survive in a harsh, dynamic environment of soft, low-oxygen soils and varying salinity. 4
7. Write short notes on any 02 (two) of the following: 3.5×2
a) Diseases of mangroves; b) Protected areas of Sundarban; and c) Integrated Mangrove Aquaculture System.

Section-B

8. a) What do you mean by fringe mangroves? When and why the fringe mangroves are converted to dwarf mangroves? 1+2
b) Briefly discuss the different root systems of mangroves. 4
9. a) How can you determine whether a coast is at risk and needs the protection by mangrove forests? 3
b) Discuss how mangrove acts as a buffer between marine and terrestrial communities and protect shorelines from natural calamities. 4
10. a) Why detrital pathway is important for the mangrove ecosystem? Discuss the major steps of detrital pathways in the mangrove forests. 2+2
b) Briefly discuss the crucial roles of crabs in the decomposition process of the mangrove ecosystem. 3
11. a) “Mangrove habitats are the most productive natural habitats for fisheries”- explain. 3
b) Discuss the management framework for Sundarban Reserve Forest. 4
12. a) Why UNESCO declared the Sundarban mangrove forest a “World Heritage” in 1999? 2
b) Briefly discuss the major threats and recovery plans of Sundarban Mangrove. 5
13. a) Why mangrove forests provide the best shelter and nursery ground for aquatic organisms. 2
b) Briefly discuss the impacts and mitigation measures of mangrove destruction on fisheries. 5
14. Write short notes on any 02 (two) of the following: 3.5×2
a) Mangrove ecotourism; b) Pollution and mangroves; and c) Dolphin Sanctuary of Sundarbans