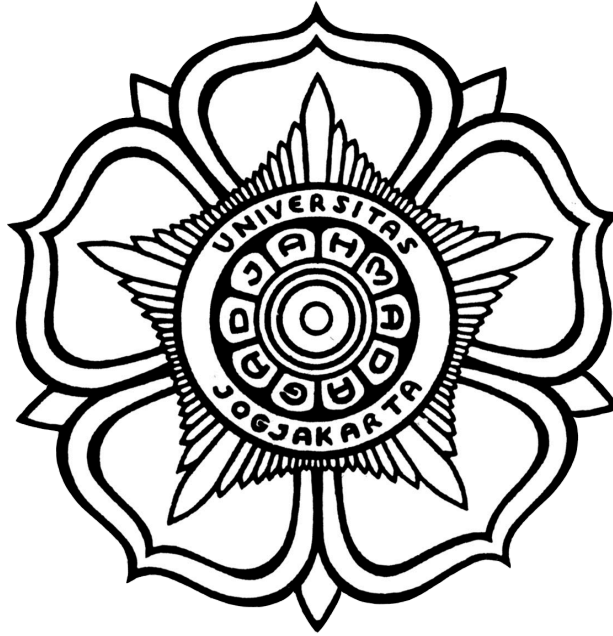


Module Handbook
Fisheries Oceanography



Composed by :

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**Master of Fisheries Science
Faculty of Agriculture
Universitas Gadjah Mada
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Module Handbook: Fisheries Oceanography

Module designation	The course is designed to study the physical, chemical and biological factors in the ocean and their interactions that can affect the distribution and abundance of fish. Phytoplankton, microbes, zooplankton, fisheries. Factors governing marine productivity, ocean temperature and salinity, movement of migratory species, phytoplankton distribution and distribution. The role of marine biota in the carbon cycle and other elements. Climate change and marine biology, influence of climate change on fish abundance. Coastal upwelling systems. Food webs. Harmful algal blooms, coral bleaching, ocean acidification, hypoxia, global fisheries. Development of fishing methods based on natural phenomena and conducting data analysis exercises.
Semester(s) in which the module is taught	2
Person responsible for the module	Dr. Eko Setyobudi, S.Pi., M.Si. Dr. Ratih Ida Adharini, S.Pi., M.Si. Dr.rer.nat. Riza Yuliratno Setiawan, S.Kel., M.Sc.
Language	Indonesian
Relation to curriculum	Elective Course
Teaching methods	Activities: a) Lecture (lecture and discussion) b) Examinations c) Take home assignments d) Quiz e) Student presentation

Workload (incl. contact hours, self-study hours)	<p>1. Lecture</p> <p>2 SKS x 50 minutes x 16 meetings = 1,600 minutes</p> <p>= 26.67 hours</p> <p>= 26.67 hours/30 hours</p> <p>= 0.89 ECTS</p> <p>2. Structural Assignment</p> <p>2 SKS x 60 minutes x 16 meetings = 1,920 minutes</p> <p>= 32.00 hours</p> <p>= 32.00 hours/30 hours</p> <p>= 1.07 ECTS</p> <p>3. Self Study</p> <p>2 SKS x 60 minutes x 16 meetings = 1,920 minutes</p> <p>= 32.00 hours</p> <p>= 32.00 hours/30 hours</p> <p>= 1.07 ECTS</p> <p>Total Workload = 3.02 ECTS</p>
Credit points	2 Credit points
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Program Learning Outcomes:</p> <p>PLO-P1: Able to demonstrate theory and its application comprehensively in the fields of aquaculture, aquatic resource management, fish product technology</p> <p>PLO-P2: Able to examine problems and formulate appropriate solutions in the field of aquaculture/aquatic resource management/fish product technology</p>

Content	<ol style="list-style-type: none"> 1. Introduction <ul style="list-style-type: none"> - PPKPS - Introductory lecture - Rules of the game - Basic student identification 2. Introduction to Fisheries Oceanography <ul style="list-style-type: none"> - Definition of Fisheries Oceanography - History of Fisheries Oceanography - Fields of science that support Fisheries Oceanography - The importance of Oceanography in the field of fisheries and its application in the field 3. Environmental factors in marine fisheries <ul style="list-style-type: none"> - Physical, chemical, and biological factors - Influence of Environmental Factors on Fish Behaviours 4. Early Life Stage/Early Life History <ul style="list-style-type: none"> - Definition of fish early life stage - "Cushing" hypothesis - Environmental influences on fish early life stage - Abundance and distribution of fish eggs and larvae in the ocean 5. Ocean acidification and Coastal upwelling <ul style="list-style-type: none"> - Definition of ocean acidification - Factors that cause ocean acidification - Effects of ocean acidification on ocean communities and coral reefs - Definition of Coastal Upwelling - The effect of coastal upwelling on marine fisheries 6. The El Nino and La Nina phenomenon and the impact of climate on ocean conditions <ul style="list-style-type: none"> - Definition of El Nino and La Nina - Things that affect the occurrence of El Nino and La Nina - The influence of El Nino and La Nina in the world of fisheries - Understand the causes of world climate change - The impact of climate change on the world of fisheries
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	<p>7. Midterm Exam (UTS)</p> <p>8. Global Fisheries Production and Climate Change</p> <ul style="list-style-type: none"> - Fisheries production, trends, and threats - Direct and indirect effects of climate change on fish distribution and abundance <p>9. Herring/anchovy/sardine fishery</p> <ul style="list-style-type: none"> - Character of herring/anchovy/sardine fishery - Producing countries/regions of herring/anchovy/sardine - Linkage of ocean physic-chemical-biological factors to herring/anchovy/sardine fisheries <p>10. Skipjack/bonito fishery</p> <ul style="list-style-type: none"> - Characteristics of the skipjack tuna/bonito fishery - Country/region of skipjack tuna/bonito producers - Relationship of ocean physic-chemical-biological factors with skipjack tuna/bonito fishery <p>11. Squid/cephalopods fishery</p> <ul style="list-style-type: none"> - Squid/cephalopods fishery characteristics - Squid/cephalopod producing country/region - Relationship between ocean physic-chemical-biological factors and squid fishery <p>12. Tuna, billfish fishery</p> <ul style="list-style-type: none"> - Character of tuna fishery (species, distribution and importance) - Tuna and billfish producing countries/regions - Relevance of ocean physic-chemical-biological factors to tuna, billfish fisheries <p>13. Student presentations related to current issues related to fisheries oceanography</p> <p>14. Final Semester Examination (UAS)</p>
Examination forms	Powerpoint, Laptop, LCD, eLearning Platform such as eLOK, simaster
Study and examination requirements	The minimum of student attendance is 70% from total 14 meetings to be eligible to take the final exams

Reading list	<ul style="list-style-type: none"> - Pinet, P.R. Invitation to Oceanography. 4ed. John and Bartlett Publisher International. - Laevastu, T., M.L. Hayes. 1981. Fisheries Oceanography and Ecology. Fishing News Books. England. 199p. - Various journals on Oceanography and Fisheries Oceanography. - Various materials that can be obtained through internet searches
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