



# BUKU PEDOMAN MATA KULIAH COURSES MODULE HANDBOOK

OSEANOGRAFI FISIK LANJUT  
ADVANCED PHYSICAL OCEANOGRAPHY

DEPARTEMEN TEKNIK GEOMATIKA  
Fakultas Teknik Sipil, Perencanaan, dan Kebumian

*DEPARTMENT OF GEOMATICS ENGINEERING  
Faculty of Civil Engineering, Planning, and Geo Engineering*

INSTITUT TEKNOLOGI SEPULUH NOPEMBER

## 26. Oseanografi Fisik Lanjut / Advanced Physical Oceanography

<b>Nama modul</b> <i>Module name</i>	Oseanografi Fisik Lanjut <i>Advanced Physical Oceanography</i>
<b>Tingkatan</b> <i>Module level</i>	Pasca Sarjana (S2) <i>Master Degree</i>
<b>Kode</b> <i>Code</i>	CM235803
<b>Mata kuliah</b> <i>Course</i>	Oseanografi Fisik Lanjut <i>Advanced Physical Oceanography</i>
<b>Semester</b> <i>Semester</i>	III (tiga) atau IV (empat) <i>III (three) or IV (four)</i>
<b>Penanggung jawab mata kuliah</b> <i>Person responsible for the module</i>	Danar Guruh Pratomo, S.T., M.T., Ph.D.
<b>Dosen</b> <i>Lecturer</i>	Danar Guruh Pratomo, S.T., M.T., Ph.D.
<b>Bahasa</b> <i>Language</i>	Bahasa Indonesia dan Bahasa Inggris <i>Indonesian and English</i>
<b>Relasi pada kurikulum</b> <i>Relation to curriculum</i>	Mata kuliah pilihan untuk Program Master Teknik Geomatika <i>Elective Courses for Master of Geomatics Engineering</i>
<b>Tipe pertemuan, jam tatap muka</b> <i>Type of teaching, contact hours</i>	Kuliah, 1.67 jam x 16 minggu per semester <i>Lecture, 1.67 hours x 16 weeks per semester</i>
<b>Beban belajar</b> <i>Workload</i>	<p>Kuliah: 1.67 jam x 14 minggu = 23.38 jam            Penugasan terstruktur: 2 jam x 14 minggu= 28 jam            Kegiatan mandiri: 2 jam x 14 minggu = 28 jam            Ujian: 1.67 jam x 2 kali = 3.34 jam            Paper review: 2.83 jam x 14 = 39.62            Studi Case-based: 2.83 jam x 14 = 39.62            Total = 161.96 jam</p> <p><i>Lecture: 1.67 hours x 14 weeks = 23.38 hours            Structured exercises and assignments: 2 hours x 14 weeks = 28 hours            Independent activities: 2 hours x 14 weeks = 28 hours            Exam: 1.67 hours x 2 time = 3.34 hours            Paper review: 2.83 jam x 14 = 39.62            Case-based study: 2.83 jam x 14 = 39.62            Total = 161.96 hours</i></p>
<b>Kredit</b> <i>Credits</i>	2 SKS + 2 SKS tambahan beban <i>2 credits + 2 credits additional activities</i>
<b>Persyaratan sesuai dengan peraturan ujian</b>	Minimum 80% kehadiran untuk mengikuti ujian tertulis

<i>Requirements according to the examination regulations</i>	<i>Minimum 80% attendance in this course in order to take the exams</i>
<b>Deskripsi Mata Kuliah</b>	Mata kuliah ini berfokus pada pengenalan dan pemahaman mengenai proses fisik lautan dan keterkaitannya terhadap survei pemetaan di laut. Secara umum, pendekatan fenomena yang terjadi di area pesisir seperti proses pantai maupun estuari dan fluktuasi muka air laut juga disampaikan dalam mata kuliah ini. Selain itu, dipaparkan pula berbagai instrumen untuk mengobservasi fenomena tersebut. Mata kuliah ini ditujukan kepada mahasiswa magister yang akan melakukan penelitian mengenai geomatika kelautan. Program pada mata kuliah ini baik berupa pemaparan materi, praktikum atau pemodelan, maupun penugasan lainnya akan mampu memberikan kesempatan kepada mahasiswa agar dapat berpikir kritis terhadap fenomena fisik di lautan beserta pengaruhnya terhadap hasil akuisisi data kedalaman menggunakan instrumen akustik untuk pemetaan laut.
<i>Description of Course</i>	<i>This course focuses on the introduction and understanding of the physical processes of the ocean and their relationship to mapping surveys at sea. In general, approaches to phenomena that occur in coastal areas such as coastal processes and estuaries and sea level fluctuations are also presented in this course. In addition, various instruments to observe this phenomenon are presented. This course is intended for master students who will conduct research on marine geomatics. Programs in this course in the form of material presentations, practicum or modeling, as well as other assignments will be able to provide opportunities for students to think critically about physical phenomena in the ocean and their effects on the results of depth data acquisition using acoustic instruments for ocean mapping.</i>
<b>Capaian Pembelajaran / Course Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Mahasiswa mampu memahami konsep dan teori dari proses fisik di lautan atau oseanografi fisik</li> <li>2. Mahasiswa mampu menjelaskan keterikatan antara laut dan atmosfer</li> <li>3. Mahasiswa mengetahui proses dan parameter distribusi panas di lautan (ocean heat budget)</li> <li>4. Mahasiswa memahami berbagai parameter fisik lautan yang berhubungan dengan propagasi gelombang suara di kolom air</li> </ol>

	<p>5. Mahasiswa mampu menjelaskan konsep pengaruh parameter fisik lautan terhadap cepat rambat gelombang suara</p> <p>6. Mahasiswa mampu mengetahui tentang dinamika air laut</p> <p>7. Mahasiswa mengetahui proses terbentuknya pantai beserta geomorfologi pesisir</p> <p>8. Mahasiswa mengetahui instrumen yang digunakan dalam observasi fenomena fisik di lautan</p>																																																																																										
<i>Module objectives / course learning outcomes</i>	<p>1. <i>Students are able to understand the concepts and theories of physical processes in the ocean or physical oceanography</i></p> <p>2. <i>Students are able to explain the relationship between the ocean and the atmosphere</i></p> <p>3. <i>Students know the process and parameters of heat distribution in the ocean (ocean heat budget)</i></p> <p>4. <i>Students understand the various physical parameters of the oceans related to the propagation of sound waves in the water column</i></p> <p>5. <i>Students are able to explain the concept of the influence of ocean physical parameters on the speed of sound waves</i></p> <p>6. <i>Students are able to know about the dynamics of seawater</i></p> <p>7. <i>Students know the process of the formation of the coast along with coastal geomorphology</i></p> <p>8.</p> <p>9. <i>Students know the instruments used in observing physical phenomena in the ocean</i></p>																																																																																										
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<b>Pokok Bahasan</b>	<p>1. Pengantar oceanografi dan oseanografi fisika</p> <p>2. Pengaruh atmosfer terhadap lautan</p>																																																																																										

	<p>3. <i>Ocean heat budget</i>          4. Temperatur, salinitas, densitas          5. <i>Harmonic sound speed</i>          6. Dinamika air laut: <i>current, ocean wave, tides</i>          7. Proses pantai: <i>coastal process</i> dan pasang surut          8. Estuari          9. Instrumen observasi parameter oseanografi          10. <i>Shelf processes-stratification</i>          11. R.O.F.I's</p>																
<i>Content</i>	<p>1. <i>Introduction to oceanography and physical oceanography</i>          2. <i>The influence of the atmosphere on the ocean</i>          3. <i>Ocean heat budget</i>          4. <i>Temperature, salinity, density</i>          5. <i>Harmonic sound speed</i>          6. <i>Ocean dynamics: current, ocean wave, tides</i>          7. <i>Coastal processes: coastal process and tides</i>          8. <i>Estuary</i>          9. <i>Instruments for observing oceanographic parameters</i>          10. <i>Shelf processes-stratification</i>          11. <i>R.O.F.I's</i></p>																
<b>Pembelajaran dan Persyaratan Ujian</b> <i>Study and examination requirements and forms of examination</i>	<table border="1"> <thead> <tr> <th><b>Rencana Evaluasi</b></th><th><b>Bobot Weight</b></th></tr> </thead> <tbody> <tr> <td>Tugas 1. Interaksi Lautan dan Atmosfer Task 1. Ocean - Atmosphere Interaction</td><td>5%</td></tr> <tr> <td>Tugas 2. Kondisi Fisik Laut Task 2. Physical Setting of the Ocean</td><td>5%</td></tr> <tr> <td>Kuis 1. Dinamika Air Laut Quiz 1. Ocean Dynamics</td><td>5%</td></tr> <tr> <td>Evaluasi Tengah Semester <i>Mid Semester Exam</i></td><td>25%</td></tr> <tr> <td>Tugas 3. Proses Pantai dan Instrumennya Task 3. Coastal Process and Instruments</td><td>15%</td></tr> <tr> <td>Kuis 2. ROFi Quiz 2. ROFi</td><td>15%</td></tr> <tr> <td>Evaluasi Akhir Semester <i>Final Exam</i></td><td>30%</td></tr> </tbody> </table>	<b>Rencana Evaluasi</b>	<b>Bobot Weight</b>	Tugas 1. Interaksi Lautan dan Atmosfer Task 1. Ocean - Atmosphere Interaction	5%	Tugas 2. Kondisi Fisik Laut Task 2. Physical Setting of the Ocean	5%	Kuis 1. Dinamika Air Laut Quiz 1. Ocean Dynamics	5%	Evaluasi Tengah Semester <i>Mid Semester Exam</i>	25%	Tugas 3. Proses Pantai dan Instrumennya Task 3. Coastal Process and Instruments	15%	Kuis 2. ROFi Quiz 2. ROFi	15%	Evaluasi Akhir Semester <i>Final Exam</i>	30%
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<b>Media yang digunakan</b> <i>Media employed</i>	Classical teaching tools with white board and power point presentation																
<b>Daftar Pustaka</b> <i>Reading list</i>	<ol style="list-style-type: none"> <li>Stewart, R.H., 2000. Introduction to Physical Oceanography. Department of Oceanography</li> <li>Sahala Hutabarat dan Stewart M. Evans. 2008. Pengantar Oseanografi. UI Press</li> </ol>																

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|  | <ul style="list-style-type: none"><li>3. David Tolmazin. 1985. Elements of Dynamic Oceanography. Springer, Dordrecht</li><li>4. John H. Simpson dan Jonathan Sharples. 2012. Introduction to the Physical and Biological Oceanography of Shelf Seas. Cambridge University Press</li><li>5. Matthias Tomczak. 2000. Introduction to Physical Oceanography</li><li>6. Matthias Tomczak. 2000. Shelf and Coastal Oceanography.</li></ul> |
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