

PROGRAM STUDI MAGISTER TEKNIK GEOMATIKA  
MASTER OF GEOMATICS ENGINEERING



# BUKU PEDOMAN MATA KULIAH *COURSES MODULE HANDBOOK*

OSEANOGRAFI FISIK LANJUT  
ADVANCED PHYSICAL OCEANOGRAPHY

DEPARTEMEN TEKNIK GEOMATIKA  
Fakultas Teknik Sipil, Perencanaan, dan Kebumihan

*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>	<b>Oseanografi Fisik Lanjut</b> <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</i>  <i>Structured exercises and assignments: 2 hours x 14 weeks = 28 hours</i>  <i>Independent activities: 2 hours x 14 weeks = 28 hours</i>  <i>Exam: 1.67 hours x 2 time = 3.34 hours</i>  <i>Paper review: 2.83 jam x 14 = 39.62</i>  <i>Case-based study: 2.83 jam x 14 = 39.62</i>  <i>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



<p><i>Module objectives / course learning outcomes</i></p>	<ol style="list-style-type: none"> <li>5. Mahasiswa mampu menjelaskan konsep pengaruh parameter fisik lautan terhadap cepat rambat gelombang suara</li> <li>6. Mahasiswa mampu mengetahui tentang dinamika air laut</li> <li>7. Mahasiswa mengetahui proses terbentuknya pantai beserta geomorfologi pesisir</li> <li>8. Mahasiswa mengetahui instrumen yang digunakan dalam observasi fenomena fisik di lautan</li> </ol> <ol style="list-style-type: none"> <li>1. <i>Students are able to understand the concepts and theories of physical processes in the ocean or physical oceanography</i></li> <li>2. <i>Students are able to explain the relationship between the ocean and the atmosphere</i></li> <li>3. <i>Students know the process and parameters of heat distribution in the ocean (ocean heat budget)</i></li> <li>4. <i>Students understand the various physical parameters of the oceans related to the propagation of sound waves in the water column</i></li> <li>5. <i>Students are able to explain the concept of the influence of ocean physical parameters on the speed of sound waves</i></li> <li>6. <i>Students are able to know about the dynamics of seawater</i></li> <li>7. <i>Students know the process of the formation of the coast along with coastal geomorphology</i></li> <li>8.</li> <li>9. <i>tudents know the instruments used in observing physical phenomena in the ocean</i></li> </ol>																																																																																										
<p><b>CPMK dan hubungan dengan CPL Prodi</b> <i>Learning outcomes and their corresponding to PLOs</i></p>	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>PLO.1</th> <th>PLO.2</th> <th>PLO.3</th> <th>PLO.4</th> <th>PLO.5</th> <th>PLO.6</th> <th>PLO.7</th> <th>PLO.8</th> <th>PLO.9</th> </tr> </thead> <tbody> <tr> <td>CLO.1</td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLO.2</td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLO.3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>CLO.4</td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLO.5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>CLO.6</td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLO.7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>CLO.8</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> </tr> </tbody> </table>		PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	CLO.1				✓						CLO.2					✓	✓				CLO.3							✓			CLO.4				✓						CLO.5							✓			CLO.6					✓					CLO.7						✓	✓			CLO.8								✓	
	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9																																																																																		
CLO.1				✓																																																																																							
CLO.2					✓	✓																																																																																					
CLO.3							✓																																																																																				
CLO.4				✓																																																																																							
CLO.5							✓																																																																																				
CLO.6					✓																																																																																						
CLO.7						✓	✓																																																																																				
CLO.8								✓																																																																																			
<p><b>Mata kuliah wajib prasyarat</b> <i>Mandatory prerequisites</i></p>	<p style="text-align: center;">-</p>																																																																																										
<p><b>Pokok Bahasan</b></p>	<ol style="list-style-type: none"> <li>1. Pengantar oceanografi dan oseanografi fisika</li> <li>2. Pengaruh atmosfer terhadap lautan</li> </ol>																																																																																										

<p><i>Content</i></p>	<ol style="list-style-type: none"> <li>3. <i>Ocean heat budget</i></li> <li>4. <i>Temperatur, salinitas, densitas</i></li> <li>5. <i>Harmonic sound speed</i></li> <li>6. <i>Dinamika air laut: current, ocean wave, tides</i></li> <li>7. <i>Proses pantai: coastal process dan pasang surut</i></li> <li>8. <i>Estuari</i></li> <li>9. <i>Instrumen observasi parameter oseanografi</i></li> <li>10. <i>Shelf processes-stratification</i></li> <li>11. <i>R.O.F.I's</i></li> </ol> <ol style="list-style-type: none"> <li>1. <i>Introduction to oceanography and physical oceanography</i></li> <li>2. <i>The influence of the atmosphere on the ocean</i></li> <li>3. <i>Ocean heat budget</i></li> <li>4. <i>Temperature, salinity, density</i></li> <li>5. <i>Harmonic sound speed</i></li> <li>6. <i>Ocean dynamics: current, ocean wave, tides</i></li> <li>7. <i>Coastal processes: coastal process and tides</i></li> <li>8. <i>Estuary</i></li> <li>9. <i>Instruments for observing oceanographic parameters</i></li> <li>10. <i>Shelf processes-stratification</i></li> <li>11. <i>R.O.F.I's</i></li> </ol>																
<p><b>Pembelajaran dan Persyaratan Ujian</b> <i>Study and examination requirements and forms of examination</i></p>	<table border="1" data-bbox="710 1093 1428 1731"> <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%
<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%																
<p><b>Media yang digunakan</b> <i>Media employed</i></p>	<p>Classical teaching tools with white board and power point presentation</p>																
<p><b>Daftar Pustaka</b> <i>Reading list</i></p>	<ol style="list-style-type: none"> <li>1. Stewart, R.H., 2000. Introduction to Physical Oceanography. Department of Oceanography</li> <li>2. Sahala Hutabarat dan Stewart M. Evans. 2008. Pengantar Oseanografi. UI Press</li> </ol>																

	<ol 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></ol>
--	---