



BUKU PEDOMAN MATA KULIAH COURSES MODULE HANDBOOK

REKAYASA SURVEI HIDROGRAFI
APPLIED HYDROGRAPHIC SURVEY

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

24. Rekayasa Survei Hidrografi / Applied Hydrographic Survey

Nama modul <i>Module name</i>	Rekayasa Survei Hidrografi <i>Applied Hydrographic Survey</i>
Tingkatan <i>Module level</i>	Pasca Sarjana (S2) <i>Master Degree</i>
Kode <i>Code</i>	CM235801
Mata kuliah <i>Course</i>	Rekayasa Survei Hidrografi <i>Applied Hydrographic Survey</i>
Semester <i>Semester</i>	III (tiga) atau IV (empat) <i>III (three) or IV (four)</i>
Penanggung jawab mata kuliah <i>Person responsible for the module</i>	Danar Guruh Pratomo, S.T., M.T., Ph.D.
Dosen <i>Lecturer</i>	Danar Guruh Pratomo, S.T., M.T., Ph.D.
Bahasa <i>Language</i>	Bahasa Indonesia dan Bahasa Inggris <i>Indonesian and English</i>
Relasi pada kurikulum <i>Relation to curriculum</i>	Mata kuliah pilihan untuk Program Master Teknik Geomatika <i>Elective Courses for Master of Geomatics Engineering</i>
Tipe pertemuan, jam tatap muka <i>Type of teaching, contact hours</i>	Kuliah, 2.5 jam x 16 minggu per semester Lecture, 2.5 hours x 16 weeks per semester
Beban belajar <i>Workload</i>	Kuliah: 2.5 jam x 14 minggu = 35 jam Penugasan terstruktur: 2.5 jam x 14 minggu= 35 jam Kegiatan mandiri: 2.5 jam x 14 minggu= 35 jam Ujian: 2.5 jam x 2 kali = 5 jam Paper review: 3 jam x 14 = 42 jam Studi Case-based: 3 jam x 14 = 42 jam Total = 194 jam <i>Lecture: 2.5 hours x 14 weeks = 35 hours</i> <i>Structured exercises and assignments: 2.5 x 14 weeks = 35 hours</i> <i>Independent activities: 2.5 x 14 weeks = 35 hours</i> <i>Exam: 2.5 hours x 2 time = 5 hours</i> <i>Paper review: 3 jam x 14 = 42 hours</i> <i>Case-based study: 3 jam x 14 = 42 hours</i> <i>Total = 194 hours</i>
Kredit <i>Credits</i>	3 SKS <i>3 credits</i>
Persyaratan sesuai dengan peraturan ujian	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>
Deskripsi Mata Kuliah	Mata kuliah Rekayasa Survei Hidrografi berfokus pada pemahaman konsep hidrografi secara terperinci meliputi aspek teknis instrumen akustik (echosounder), propagasi gelombang suara di kolom air, hingga aplikasi survei hidrografi. Selain itu, faktor-faktor lainnya yang berkaitan dengan survei hidrografi juga dibahas pada mata kuliah ini seperti pasang surut air laut dan <i>Underwater Acoustic Positioning</i> . Secara keseluruhan, mata kuliah ini akan memberikan pemahaman kepada mahasiswa terkait cara kerja instrumen akustik beserta faktor-faktor yang mempengaruhinya. Mata kuliah ini dirancang bagi mahasiswa magister yang fokus pada bidang geomatika kelautan dengan keterkaitannya pada mata kuliah lain seperti oseanografi fisik lanjut. Selain itu, mata kuliah ini juga bersinggungan dengan kelompok keilmuan kadaster melalui Kadaster Laut Lanjut dan Aspek Geodetik dalam Penentuan Hukum Laut. Pengalaman praktis pada mata kuliah ini akan memberikan kesempatan kepada mahasiswa untuk memahami lebih dalam mengenai survei hidrografi dan mampu mengaplikasikannya pada variasi tujuan survei hidrografi di masa depan.
<i>Description of Course</i>	<i>The Applied Hydrographic Survey course focuses on understanding hydrographic concepts in detail including technical aspects of acoustic instruments (echosounder), sound wave propagation in the water column, and hydrographic survey applications. In addition, other factors related to hydrographic surveys are also discussed in this course such as tides and Underwater Acoustic Positioning. Overall, this course will provide students with an understanding of how acoustic instruments work and the factors that influence it. This course is designed for master students who focus on the field of marine geomatics with its links to other subjects such as advanced physical oceanography. In addition, this course also intersects with cadastral scientific groups through Advanced Marine Cadastre and Geodetic Aspects in Determining the Law of the Sea. Practical experience in this course will give students the opportunity to understand more deeply about hydrographic surveying and be able to apply it to various hydrographic survey objectives in the future.</i>
Capaian Pembelajaran / Course Learning Outcomes	1. Mahasiswa mampu mengetahui konsep dan aplikasi survei hidrografi

	<ol style="list-style-type: none"> 2. Mahasiswa memahami aspek teknis instrumen akustik bawah air dan gerak kapal 3. Mahasiswa mampu mendeskripsikan propagasi gelombang suara di kolom air 4. Mahasiswa mampu memahami konsep dan menghitung cepat rambat gelombang suara di kolom air 5. Mahasiswa mengetahui faktor-faktor yang mempengaruhi propagasi gelombang suara di kolom air 6. Mahasiswa mengenal konsep Multispektral Multibeam Echosounder 7. Mahasiswa mampu menjelaskan mengenai pasang surut dan pengaruhnya terhadap survei hidrografi 8. Mahasiswa mengetahui mengenai Underwater Acoustic Positioning beserta aplikasinya 																																																																																										
<i>Module objectives/ learning outcomes</i>	<ol style="list-style-type: none"> 1. <i>Students are able to know the concept and application of hydrographic survey</i> 2. <i>Students understand the technical aspects of underwater acoustic instruments and ship motion</i> 3. <i>Students are able to describe the propagation of sound waves in the water column</i> 4. <i>Students are able to understand the concept and calculate the speed of sound waves in the water column</i> 5. <i>Students know the factors that affect the propagation of sound waves in the water column</i> 6. <i>Students are familiar with the concept of Multispectral Multibeam Echosounder</i> 7. <i>Students are able to explain about tides and their effects on hydrographic surveys.</i> 8. <i>Students know about Underwater Acoustic Positioning and its applications</i> 																																																																																										
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Mata kuliah wajib prasyarat <i>Mandatory prerequisites</i>	-										
Pokok Bahasan	<ol style="list-style-type: none"> 1. Teori dan konsep dalam survei hidrografi 2. Aplikasi survei hidrografi dalam berbagai bidang dan keperluan 3. Aspek teknis instrumen akustik bawah air 4. Ship's motion and Transducer Mounting 5. Konsep propagasi gelombang suara di kolom air 6. Faktor-faktor yang mempengaruhi propagasi gelombang suara saat akuisisi 7. Perhitungan kecepatan gelombang suara di kolom air 8. Konsep dan aplikasi Multispektral Multibeam Echosounder 9. Pasang surut dan perannya terhadap survei hidrografi 10. Cara kerja dan aplikasi Underwater Acoustic Positioning 										
<i>Content</i>	<ol style="list-style-type: none"> 1. <i>Theories and concepts in hydrographic surveying</i> 2. <i>Application of hydrographic surveys in various fields and purposes</i> 3. <i>Technical aspects of underwater acoustic instruments</i> 4. <i>Ship's motion and Transducer Mounting</i> 5. <i>Concept of sound wave propagation in the water column</i> 6. <i>Factors affecting the propagation of sound waves during acquisition</i> 7. <i>Calculation of the speed of sound waves in the water column</i> 8. <i>Multispectral Multibeam Echosounder concept and application</i> 9. <i>Tides and their role in hydrographic surveys</i> 10. <i>How Underwater Acoustic Positioning works and application</i> 										
Pembelajaran dan Persyaratan Ujian <i>Study and examination requirements and forms of examination</i>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Rencana Evaluasi</th> <th style="text-align: center;">Bobot Weight</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Tugas 1 <i>Assignment 1</i></td> <td style="text-align: center; padding: 5px;">25%</td> </tr> <tr> <td style="padding: 5px;">Evaluasi Tengah Semester <i>Mid Semester Exam</i></td> <td style="text-align: center; padding: 5px;">25%</td> </tr> <tr> <td style="padding: 5px;">Tugas 2 <i>Assignment 2</i></td> <td style="text-align: center; padding: 5px;">25%</td> </tr> <tr> <td style="padding: 5px;">Evaluasi Akhir Semester <i>Final Semester Exam</i></td> <td style="text-align: center; padding: 5px;">25%</td> </tr> </tbody> </table>	Rencana Evaluasi	Bobot Weight	Tugas 1 <i>Assignment 1</i>	25%	Evaluasi Tengah Semester <i>Mid Semester Exam</i>	25%	Tugas 2 <i>Assignment 2</i>	25%	Evaluasi Akhir Semester <i>Final Semester Exam</i>	25%
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Media yang digunakan <i>Media employed</i>	Classical teaching tools with white board and power point presentation
Daftar Pustaka <i>Reading list</i>	<ol style="list-style-type: none"> 1. IHO., 2020. IHO Standards for Hydrographic Survey. 6th Edition. Special Publication 44. Monaco 2. Poerbandono., Djunarsjah, E. 2005. Survei Hidrografi. Bandung: Refika Aditama 3. IHO., 2005. Manual On hydrography. Monaco. International Hydrographic Beareau 4. Lurton, Xavier. 2010. An Introduction to Underwater Acoustic: Principles and Applications: Second Edition. Perancis. Praxis Publ.