PROGRAM STUDI MAGISTER TEKNIK GEOMATIKA
MASTER OF GEOMATICS ENGINEERING

BUKU PEDOMAN MATA KULIAH

COURSES MODULE HANDBOOK

GNSS ATMOSFIR

ATMOSPHERIC GNSS

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

5. GNSS Atmosfir / *Atmospheric GNSS*

Nama modul *Module name*	**GNSS Atmosfir** *Atmospheric GNSS*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	CM235505
Mata kuliah *Course*	GNSS Atmosfir *Atmospheric GNSS*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Dr. Eko Yuli Handoko, S.T., M.T.
Dosen *Lecturer*	Dr. Eko Yuli Handoko, S.T., M.T.
Bahasa *Language*	Bahasa Indonesia dan Bahasa Inggris *Indonesian and English*
Relasi pada kurikulum *Relation to curriculum*	Mata kuliah pilihan untuk Program Master Teknik Geomatika *Elective Courses for Master of Geomatics Engineering*
Tipe pertemuan, jam tatap muka *Type of teaching, contact hours*	Kuliah, 1.67 jam x 16 minggu per semester *Lecture, 1.67 hours x 16 weeks per semester*
Beban belajar *Workload*	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 *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*
Kredit *Credits*	2 SKS + 2 SKS tambahan beban *2 credits + 2 credits additional activities*
Persyaratan sesuai dengan peraturan ujian *Requirements according to theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*

<table>
<tr><td>Deskripsi Mata Kuliah
Description of Course</td><td></td></tr>
<tr><td>Capaian Pembelajaran / Course Learning Outcomes

Module objectives/ Course learning outcomes</td><td>1. Mahasiswa mampu menjelaskan karateristik troposfir serta fenomena meteorologi yang mempengaruhinya.
2. Mahasiswa mampu menjelaskan karateristik ionosfer beserta fenomena yang mempengaruhinya.
3. mahasiswa mampu menjelaskan pengaruh medium troposfir dan ionosfir pada perambatan sinyal GNSS.
4. Mahasiswa mampu menganalisis hasil pengolahan data GNSS untuk keperluan studi Atmosfir (troposfer dan ionosfer)

1. Students are able to explain the characteristics of the troposphere and the meteorological phenomena that affect it.
2. Students are able to explain the characteristics of the ionosphere and the phenomena that influence it.
3. Students are able to explain the influence of the troposphere and ionosphere medium on the propagation of GNSS signals.
4. Students are able to analyze the results of GNSS data processing for atmospheric studies (troposphere and ionosphere).</td></tr>
<tr><td>CPL Prodi yang dibebankan
Learning outcomes and their corresponding to PLOs</td><td>
<table>
<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>
<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></td><td></td><td></td><td></td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
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<tr><td>Mata kuliah wajib prasyarat
Mandatory prerequisites</td><td>-</td></tr>
<tr><td>Pokok Bahasan</td><td>1. Fenomena hidro-meterologi dan parameter yang mengakibatkan dinamika pada cuaca dan iklim
2. Karakteristik atmosfer berdasarkan ketinggian, sifat fisis, pengaruhnya terhadap perambatan gelombang dan fenomena
3. Sistem pengamatan GPS/GNSS, sumber kasalahan dan metode untuk mereduksi
4. Sifat fisis lapisan troposfer dan pengaruhnya terdapat perambatan sinyal GPS/GNSS
5. Fenomena yang mempengaruhi kadar uap air dan metode untuk menghitungnya
6. Jumlah kadar upa air dan fenomena uap air dan fenomena yang mempengaruhi dinamikanya</td></tr>
</table>

<table>
<tr><td>Content</td><td>7. Pengaruh dari perubahan iklim terhadap kandungan parameter fisis cuaca
8. Karakteristik atmosfer luar angkasa dan sifat fisisnya
9. Karakteristik variasi spasial dan temporal dari atmosfer luas angkasa
10. Karakteristik lapisan ionosfer dan sifat fisisnya
11. Konsep GPS/GNSS tomografi
12. Gangguan ionosfer dari aktivitas bumi padat

1. Hydro-meteorological phenomena and parameters that cause dynamics in weather and climate
2. Characteristics of the atmosphere based on height, physical properties, its influence on wave propagation and phenomena
3. GPS/GNSS observation system, sources of error and methods for reducing
4. The physical properties of the troposphere layer and its influence on the propagation
5. Phenomena that influence water vapor levels and methods for calculating them
6. The amount of water vapor content and water vapor phenomena and phenomena that influence
7. The influence of climate change on the physical parameters of weather
8. Characteristics of the outer space atmosphere and its physical properties
9. Characteristics of spatial and temporal variations in the vast atmosphere
10. Characteristics of the ionosphere layer and its physical properties
11. The concept of GPS/GNSS tomography
12. Ionospheric disturbances from solid earth activity</td></tr>
<tr><td>Pembelajaran dan Persyaratan Ujian
Study and examination requirements and forms of examination</td><td><table><tr><th>Rencana Evaluasi</th><th>Bobot
Weight</th></tr><tr><td>Tugas
Assessments</td><td>25%</td></tr><tr><td>Studi kasus
Case Project</td><td>25%</td></tr><tr><td>Evaluasi Tengah Semester
Mid Semester Exam</td><td>25%</td></tr><tr><td>Evaluasi Akhir Semester
Final Semester Exam</td><td>25%</td></tr></table></td></tr>
<tr><td>Media yang digunakan
Media employed</td><td>Classical teaching tools with whiteboard and powerpoint presentation</td></tr>
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Daftar Pustaka *Reading list*	