PROGRAM STUDI MAGISTER TEKNIK GEOMATIKA
MASTER OF GEOMATICS ENGINEERING

BUKU PEDOMAN MATA KULIAH

COURSES MODULE HANDBOOK

PENGINDERAAN JAUH SISTEM AKTIF

ACTIVE SYSTEM REMOTE SENSING

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

22. Penginderaan Jauh Sistem Aktif / *Active System Remote Sensing*

Nama modul *Module name*	**Penginderaan Jauh Sistem Aktif** *Active System Remote Sensing*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	CM235709
Mata kuliah *Course*	Penginderaan Jauh Sistem Aktif *Active System Remote Sensing*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Dr.-Ing. Noorlaila Hayati, S.T., M.T.
Dosen *Lecturer*	Dr.-Ing. Noorlaila Hayati, 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 memiliki pengetahuan tentang konsep dan aplikasi Radar untuk pemetaan
2. Mahasiswa memiliki pengetahuan tentang dasar teori dan metode pengolahan citra Radar
3. Mahasiswa mampu melakukan analisa citra Radar dengan menggunakan citra SAR dan teknik Interferometri untuk akuisisi data spasial
4. Mahasiswa mampu memanfaatan teknologi penginderaan aktif (Radar) untuk pengelolaan sumber daya alam dan mitigasi bencana

1. Students have knowledge of Radar concepts and applications for mapping
2. Students have knowledge of the basic theory and methods of Radar image processing
3. Students are able to analyze Radar images using SAR images and Interferometry techniques for spatial data acquisition
4. Students are able to utilize active sensing technology (Radar) for natural resource management and disaster mitigation</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>CLO.4</td><td></td><td></td><td></td><td></td><td></td><td>✓</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Mata kuliah wajib prasyarat
Mandatory prerequisites</td><td>-</td></tr>
<tr><td>Pokok Bahasan</td><td>1. Pengertian dasar Radar. Konsep Penginderaan Jauh Aktif Citra Radar.
2. Gelombang elektromagnetik microwave Phase, Amplitudo dan Panjang Gelombang. Radar Conventions, Microwave spectrum dan band Propagation.
3. Sigma nought, backscattering, volume scattering, polarisasi
4. Aplikasi backscattering SAR
5. RAR dan SAR, Proses dan Cara Kerja SAR, SAR Geometri dan Parameternya
6. Proses InSAR</td></tr>
</table>

<table>
<tr><td>Content</td><td>1. Basic understanding of Radar. Radar Image Active Remote Sensing Concept.
2. Microwave electromagnetic waves Phase, Amplitude and Wavelength. Radar Conventions, Microwave spectrum and Propagation bands.
3. Sigma nought, backscattering, volume scattering, polarization
4. SAR backscattering application
5. RAR and SAR, Process and How SAR Works, SAR Geometry and Parameters
6. InSAR processing</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 SAR
SAR Assignment</td><td>25%</td></tr><tr><td>Evaluasi Tengah Semester
Middle Term Examination</td><td>25%</td></tr><tr><td>Tugas InSAR
InSAR Assignment</td><td>25%</td></tr><tr><td>Evaluasi Akhir Semester
Final Examination</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>
<tr><td>Daftar Pustaka
Reading list</td><td></td></tr>
</table>