PROGRAM STUDI MAGISTER TEKNIK GEOMATIKA
MASTER OF GEOMATICS ENGINEERING

BUKU PEDOMAN MATA KULIAH

COURSES MODULE HANDBOOK

PEMROGRAMAN DATA SPASIAL

SPATIAL DATA PROGRAMMING

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

3. Pemrograman Data Spasial / *Spatial Data Programming*

Nama modul *Module name*	**Pemrograman Data Spasial** *Spatial Data Programming*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	CM235103
Mata kuliah *Course*	Pemrograman Data Spasial *Spatial Data Programming*
Semester *Semester*	I (satu) *I (one)*
Penanggung jawab mata kuliah *Person responsible for the module*	Hepi Hapsari Handayani, S.T., M.Sc., Ph.D.
Dosen *Lecturer*	Prof. Dr. Ir. Bangun Muljo Sukojo, DEA.DESS Hepi Hapsari Handayani, S.T., M.Sc., Ph.D.
Bahasa *Language*	Bahasa Indonesia dan Bahasa Inggris *Indonesian and English*
Relasi pada kurikulum *Relation to curriculum*	Mata kuliah wajib untuk Program Master Teknik Geomatika *Compulsory Courses for Master of Geomatics Engineering*
Tipe pertemuan, jam tatap muka *Type of teaching, contact hours*	Kuliah, 2.5 jam x 16 minggu per semester *Lecture, 2.5 hours x 16 weeks per semester*
Beban belajar *Workload*	Kuliah: 2.5 jam x 14 minggu = 35 jam Penugasan terstruktur: 5 jam x 14 minggu= 70 jam Kegiatan mandiri: 6 jam x 14 minggu = 84 jam Ujian: 2.5 jam x 2 kali = 5 jam Total = 194 jam *Lecture: 2.5 hours x 14 weeks = 35 hours* *Structured exercises and assignments: 5 hours x 14 weeks = 70 hours* *Independent activities: 6 hours x 14 weeks = 84 hours* *Exam: 2.5 hours x 2 time = 5 hours* *Total = 194 hours*
Kredit *Credits*	3 SKS *3 credits*
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*

Deskripsi Mata Kuliah *Description of Course*	Pada mata kuliah ini, mahasiswa akan mempelajari dasar pemrograman, konsep dasar data spasial, menggunakan bahasa pemrograman R yang banyak digunakan untuk melakukan analisis komputasi numerik dan matematis, termasuk untuk mengolah, menyajikan dan menganalisa data spasial, baik vektor maupun raster. *In this course, students will learn the basics of programming, the basic concepts of spatial data, using the R programming language which is widely used to perform numerical and mathematical computational analysis, including processing, presenting, and analyzing spatial data, both vector and raster.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/Course learning outcomes*	1. Mahasiswa mampu melakukan pengolahan data dan analisa berdasarkan grafik dan table dalam rangka memecahkan persoalan sederhana yang terkait dengan spasial. 2. Mahasiswa mampu melakukan dasar-dasar pengolahan data matriks serta mengaplikasikan dalam bentuk format data spasial raster. 3. Mahasiswa mampu melakukan pengolahan data dan analisa berdasarkan operasi geometrik dengan vektor dan raster. 4. Mahasiswa mampu melakukan pengolahan data dan analisa berdasarkan data spatio-temporal. 5. Mahasiswa mampu melakukan pengolahan data dan analisa berdasarkan klasifikasi citra satelit. 1. *Students are able to do data processing and analysis based on graphs and tables in order to solve simple problems related to spatial.* 2. *Students are able to do the basics of matrix data processing and apply it in the form of raster spatial data format.* 3. *Students are able to perform data processing and analysis based on geometric operations with vectors and rasters.* 4. *Students are able to carry out data processing and analysis based on spatio-temporal data.* 5. *Students are able to carry out data processing and analysis based on satellite image classification.*

<table>
<tr><td>CPMK dan hubungan dengan CPL Prodi
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>
<tr><td>CLO.5</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

Content</td><td>1. Konsep dasar data spasial, transformasi data spasial, sistem koordinat, sistem proyeksi, pemecahan persoalan pemrograman data spasial. Pengertian mengenai konsep dasar yang meliputi pengertian mengenai ellipsoida referensi, geometris ellipsoida, sistem koordinat.
2. Proyeksi peta yang meliputi macam-macam transformasi koordinat, macam-macam proyeksi. Pengertian faktor skala, dibicarakan mengenai pokok bahasan transformasi sudut pada proyeksi konform, dibicarakan mengenai pengertian konvergensi meridian.

1. Basic concepts of spatial data, spatial data transformation, coordinate system, projection system, spatial data programming problem solving. Understanding of basic concepts that include the notion of reference ellipsoida, geometric ellipsoida, coordinate system.
2. A map projection that includes various coordinate transformations, various projections. Understanding the scale factor, discussed about the subject of angular transformation on conformational projection, discussed about the meridian convergence.</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 studi kasus
Assignment of case based</td><td>20%</td></tr>
<tr><td>Kognitif - Tugas
Cognitive - Assignment</td><td>20%</td></tr>
<tr><td>Evaluasi Tengah Semester
Mid Semester Exam</td><td>20%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Semester Exam</td><td>40%</td></tr>
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Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	1. Mikhail,EM, *Analysis and Adjustment of Survey Measurements*, Dun Donnelley Publisher New York, 1976. 2. Spiegel, Murray R, *Probabilty and Statistics*, McGraw-Hill,1980 3. M.Molenaar, *Introduction to the theory of Observations*, ITC Enschede Belanda, 1977.