PROGRAM STUDI MAGISTER TEKNIK GEOMATIKA
MASTER OF GEOMATICS ENGINEERING

BUKU PEDOMAN MATA KULIAH

COURSE MODULE HANDBOOK

PENGELOLAAN CITRA RESOLUSI TINGGI

HIGH RESOLUTION IMAGE PROCESSING

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

MATA KULIAH PILIHAN
(*ELECTIVE COURSE*)

Pengelolaan Citra Resolusi Tinggi / *High Resolution Image Processing*

Nama modul *Module name*	**Pengelolaan Citra Resolusi Tinggi** *High Resolution Image Processing*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185911
Mata kuliah *Course*	Pengelolaan Citra Resolusi Tinggi *High Resolution Image Processing*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Lalu Muhamad Jaelani
Dosen *Lecturer*	Bangun Muljo Sukojo Lalu Muhamad Jaelani
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, 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: 4 jam x 14 minggu= 56 jam Kegiatan mandiri: 4 jam x 14 minggu = 56 jam Ujian: 1.67 jam x 2 kali = 3.34 jam Total = 138.72 jam *Lecture: 1.67 hours x 14 weeks = 23.38 hours* *Structured exercises and assignments: 4 hours x 14 weeks = 56 hours* *Independent activities: 4 hours x 14 weeks = 56 hours* *Exam: 1.67 hours x 2 time = 3.34 hours* *Total = 138.72 hours*
Kredit *Credits*	2 SKS *2 credits*
Persyaratan sesuai dengan peraturan ujian *Requirements according to*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take*

theexamination regulations	*the exams*
Deskripsi Mata Kuliah *Description of Course*	Pada mata kuliah ini mahasiswa akan mempelajari tentang teori dasar satelit yang terdiri dari sejarah platform, prinsip dasar, fisika gelombang elektromagnetik, transport carrier, dan geometri satelit. Materi terkait satelit resolusi tinggi akan dibahas seluruhnya dalam sesi kuliah dan diskusi, yang berisi tentang jenis dan spesifikasi citra, definisi penginderaan jauh, dan karakter reflektan pada objek. Selain itu, mahasiswa juga mempelajari lebih lanjut tentang interpretasi penginderaan jauh dan peralatan dasar untuk pengolahan citra yang terdiri dari perhitungan dan interpretasi citra satelit. Tujuan akhir dari kuliah ini adalah mahasiswa mampu melakukan pemrosesan citra untuk mendapatkan peta dasar skala besar. Capaian pembelajaran dipenuhi melalui kuliah, eksperimen, dan penugasan. Hasil eksperimen dan analisis akan disajikan secara tertulis dan presentasi secara mandiri maupun bekerja bersama-sama dalam tim. *Students will study the basic theory of satellites in this course, which includes the history of the platform, basic concepts, physics of electromagnetic waves, transport carriers, and satellite geometry. Materials relating to high-resolution satellites will be thoroughly explored in lecture and discussion sessions, including types and specifications of images, remote sensing definitions, and object reflectance characteristics. In addition, students learn more about remote sensing interpretation and fundamental image processing equipment, which includes calculating and analyzing satellite pictures. The ultimate objective of this course is for students to be able to perform image processing in order to produce large-scale base maps. Lectures, experiments, and assignments are used to achieve learning objectives. The findings of experiments and analyses will be reported in writing and in presentations, either individually or collaboratively.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mampu memahami konsep dasar platform, prinsip dasar, fisika gelombang elektromagnetik, media propagasi, dan geometris satelit. 2. Mampu memahami jenis dan spesifikasi citra, citra satelit penginderaan jauh resolusi tinggi, dan karakter reflektan pada objek di permukaan bumi. 3. Mampu memahami konsep, metode, proses, alat, dan data dalam interpretasi penginderaan jauh

<table>
<tr><td>Module objectives/ Course learning outcomes</td><td>analog dan digital dan selanjutnya melakukan interpretasi tersebut sesuai dengan pemahamannya.
4. Mampu memahami pengolahan citra untuk menghitung dan menginterpretasikan citra satelit.
5. Mampu memahami kegiatan informasi geospasial metode penginderaan jauh.

1. Able to understand the basic concept of the platform, the basic principles, physics of electromagnetic waves, propagation media, and the geometrics of satellites.
2. Able to understand image types and specifications, remote sensing satellite high-resolution image, and reflectant character on objects on the earth's surface.
3. Able to understand the concept, the methods, the process, the tools, and the data in the interpretation of analog and digital remote sensing and further conduct such interpretation according to their understanding.
4. Able to understand image processing for calculating and interpreting satellite imagery.
5. Able to understand geospatial information activities of remote sensing methods.</td></tr>
<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><th>PLO.10</th><th>PLO.11</th><th>PLO.12</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><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><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><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><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><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. Konsep dasar platform sejarah, prinsip dasar, fisika gelombang elektromagnetik, wahana pengangkut, satelit geometris. Jenis dan spesifikasi citra, pengertian citra satelit penginderaan jauh resolusi tinggi, karakter reflektan pada objek di permukaan bumi. interpretasi penginderaan jauh analog: definisi dasar, interpretasi dasar, interpretasi kunci, jenis, metode, proses, alat, interpretasi data/dokumen. interpretasi penginderaan jauh (digital).
2. Peralatan dasar penginderaan jauh (pengolah citra) untuk menghitung dan menginterpretasikan citra satelit. Kegiatan informasi geospasial metode</td></tr>
</table>

<table>
<tr><td>Content</td><td>penginderaan jauh dengan membuat job requirements dan membuat orbit satelit.
3. Melaporkan hasil eksperimen dan hasil analisis secara tertulis dan lisan dengan bekerja secara mandiri dan bersama-sama dalam tim.

1. Basic concepts of historical platform, basic principles, physics of electromagnetic waves, rides of transporters, geometric satellites. Image types and specifications, understanding remote sensing satellite high-resolution image, reflectant character on objects on earth's surface. interpretation of analog remote sensing: basic definition, basic interpretation, key interpretation, types, methods, processes, tools, data / document interpretation. remote sensing interpretation (digital).
2. Remote sensing basic equipment (image processing) to calculate and interpret satellite imagery. The geospatial information activities of remote sensing methods by making job requirements and making satellite orbit.
3. Reporting experimental results and analytical results in writing and orally by working independently and together in teams.</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 1: Resolusi Citra Satelit
Assignment 1: Satellite Image Resolution</td><td>15%</td></tr><tr><td>Tugas 2: Citra Resolusi Tinggi
Assignment 2: High Resolution Image</td><td>15%</td></tr><tr><td>Tugas 3: Ortorektifikasi
Assignment 3: Orthorectification</td><td>45%</td></tr><tr><td>Presentasi: Ortorektifikasi
Presentation: Orthorectification</td><td>25%</td></tr></table></td></tr>
<tr><td>Media yang digunakan
Media employed</td><td>Media pengajaran secara klasik dengan papan tulis dan presentasi power point
Classical teaching tools with white board and power point presentation</td></tr>
<tr><td>Daftar Pustaka
Reading list</td><td>1. Church VA, Manual of Remote Sensing, American Society of Photogrammetry, New York, USA, 1983.
2. Lillesand-Kiefer, Remote Sensing and Image Interpretation, John Wiley & Sons, 1979
3. Paul J. Curran, Principle of Remote Sensing, John Wiley & Son, New York, 1985
4. Shrestha, D.P., Remote Sensing Techniques And Digital Image Processing, International Institute for Aerospace Survey and Earth Sciences, 1994</td></tr>
</table>

	5. Coleman, Diane, and Tennant, Keith, Intermap's Significant Upgrade Investments takes Radar Upscale into finer resolution territory, Intermap Article, September 2002 6. CP Lo, PenterjemahBambangPurbowaseso, PenginderaanJauhTerapan, UI Press, 1996. 7. Ford, Remote Sensing and Image Interpretation, Jhon Willey and Sons, New York, 1979. 8. Gonzales, R.C. and Wintz,P., Digital Image Processing, Addison Wesly Publishing, Massachusetts, 1987 9. Jhon RJ and Jensen, Introduction Digital Image Processing, A Remote Sensing Perspective, USA,1996 10. Jonathan Williams, Geographic Information From Space, Processing and Applications of Geocoded Satellite Images, Wiley-Praxis Series in Remote Sensing, Chichester, 1995.