PROGRAM STUDI MAGISTER TEKNIK GEOMATIKA
MASTER OF GEOMATICS ENGINEERING

BUKU PEDOMAN MATA KULIAH

COURSE MODULE HANDBOOK

SISTEM KOORDINAT DAN PROYEKSI PETA

COORDINATE SYSTEMS AND MAP PROJECTIONS

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 WAJIB
(*COMPULSORY COURSE*)

Sistem Koordinat dan Proyeksi Peta / *Coordinate Systems and Map Projections*

Nama modul *Module name*	**Sistem Koordinat dan Proyeksi Peta** *Coordinate Systems and Map Projections*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185104
Mata kuliah *Course*	Sistem Koordinat dan Proyeksi Peta *Coordinate Systems and Map Projections*
Semester *Semester*	I (satu) *I (one)*
Penanggung jawab mata kuliah *Person responsible for the module*	Mokhamad Nur Cahyadi
Dosen *Lecturer*	Bangun Muljo Sukojo Mokhamad Nur Cahyadi
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	Minimum 80% kehadiran untuk mengikuti ujian tertulis

Requirements according to theexamination regulations	*Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah *Description of Course*	Pada mata kuliah ini mahasiswa mempelajari konsep-konsep umum: konsep dasar (elipsoida referensi, ellipsoida geometri, sistem koordinat, pemecahan masalah geodesi (metode langsung dan direct invers problem) oleh Legendre dan Gausz, proyeksi peta (berbagai transformasi koordinat, jenis proyeksi, definisi faktor skala) , transformasi sudut pada proyeksi konform, konvergensi meridian, metode perhitungan sistem proyeksi oleh Polieder, Mercator, Transverse Mercator dan Universal Transverse Mercator, Transformasi Koordinat Geodesi ke Proyeksi Polieder dan sebaliknya, Transformasi Koordinat Proyeksi Geodesi ke Mercator dan sebaliknya, Transformasi Geodesi Koordinat ke Proyeksi UTM dan sebaliknya, Transformasi Koordinat Polieder ke Mercator dan sebaliknya *In this course students learn about general concepts: basic concepts (reference ellipsoida, geometric ellipsoida, coordinate system, problem solving geodesy (direct method and direct inverse problem) by Legendre and Gausz, map projection (various coordinate transformation, projection type, scale factor definition, angle transformation on conformational projection, meridian convergence, calculation method of projection system by Polieder, Mercator, Transverse Mercator and Universal Transverse Mercator, Transformation of Geodesy Coordinate to Polieder Projection and vice versa, Coordinate Transformation Geodesy to Mercator Projection and vice versa, Transforming Geodesy Coordinate to UTM Projection and vice versa, Transforming Coordinate Polieder to Mercator and vice versa.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mampu menjelaskan konsep dan geometri dalam teori proyeksi peta. 2. Mampu menjelaskan dan mengidentifikasi macam-macam proyeksi. 3. Mampu mengaplikasikan transformasi koordinat dalam pemetaan. 4. Mampu menerapkan konsep dasar untuk mengerjakan dan menyelesaikan persoalan proyeksi peta dalam geodesi.

<table>
<tr><td>Module objectives/ Course learning outcomes</td><td>5. Mampu melaporkan hasil percobaan dan hasil analisis secara tertulis dan lisan, bekerja mandiri dan bekerja sama dalam tim.

1. Able to explain concepts and geometry in map projection theory.
2. Able to explain and identify various types of projections.
3. Able to apply coordinate transformation in mapping.
4. Able to apply basic concepts to work on and solve map projection problems in geodesy.
5. Able to report experimental results and analysis results in writing and orally, work independently and work together in teams.</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>
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<tr><td>Mata kuliah wajib prasyarat
Mandatory prerequisites</td><td>-</td></tr>
<tr><td>Pokok Bahasan

Content</td><td>• Konsep dasar geodesi terkait pemodelan matematis bumi berupa ellipsoida referensi dan bentuk geometris ellipsoida.
• Sistem koordinat, dan pemecahan persoalan Geodesi menggunakan metode langsung/ direct problem dan metode tidak langsung /inverse problem dengan cara Legendre dan Gausz.
• Macam-macam sistem proyeksi, pengertian faktor skala, transformasi sudut pada proyeksi konform, dan konvergensi meridian.
• Perhitungan pada sistem proyeksi dengan cara Polieder, Mercator, Transverse Mercator dan Universal Transverse Mercator.
• Transformasi Koordinat Geodesi ke Proyeksi Mercator dan sebaliknya.
Transformasi Koordinat Geodesi ke Proyeksi UTM dan sebaliknya.

• Basic geodetic concepts related to earth mathematical modeling of reference ellipsoids and geometric shapes of ellipsoids.</td></tr>
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- *Coordinate system, and Geodetic problem solving using direct method and inverse problem by Legendre and Gausz.*
- *Various projection systems, the definition of scale factor, angular transformation of conformational projection, and meridian convergence.*
- *Calculation of the projection system by means of Polieder, Mercator, Transverse Mercator and Universal Transverse Mercator.*
- *Transforming Geodesy Coordinates to Mercator Projection and vice versa.*
- *Geodetic Coordinate Transformation to UTM Projection and vice versa.*

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<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>Presentasi 1
Presentation 1</td><td>20%</td></tr>
<tr><td>Kuis
Quiz</td><td>10%</td></tr>
<tr><td>Evaluasi Tengah Semester
Mid Semester Exam</td><td>25%</td></tr>
<tr><td>Tugas kelompok
Team based assignment</td><td>15%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Exam</td><td>30%</td></tr>
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<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. Richardus, Adler. *Map Projections for Geodetic, Cartographers, Geographers*.1972. NHPC. Amsterdam.
2. Bomford. *Geodesy*. 1975. Oxford University Press.
3. MuljoSukojo, Bangun. *Hitung Proyeksi Geodesi,* 2004. Diktat ITS. Surabaya.
4. Prihandito, Aryono. *Proyeksi Peta. 1988.* Penerbit Kanisius. Yogyakarta.
5. Muryamto, Rochmad. *Hitungan Proyeksi Peta.* 1994. Diktat UGM. Yogyakarta.

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