



BUKU PEDOMAN MATA KULIAH

COURSES MODULE HANDBOOK

SISTEM KOORDINAT DAN PROYEKSI PETA
COORDINATE SYSTEM 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

2. Sistem Koordinat dan Proyeksi Peta / Coordinate Systems and Map Projections

Nama modul <i>Module name</i>	Sistem Koordinat dan Proyeksi Peta <i>Coordinate Systems and Map Projections</i>
Tingkatan <i>Module level</i>	Pasca Sarjana (S2) <i>Master Degree</i>
Kode <i>Code</i>	CM235102
Mata kuliah <i>Course</i>	Sistem Koordinat dan Proyeksi Peta <i>Coordinate Systems and Map Projections</i>
Semester <i>Semester</i>	I (satu) I (one)
Penanggung jawab mata kuliah <i>Person responsible for the module</i>	Prof. Mokhamad Nur Cahyadi, S.T., M.Sc., Ph.D.
Dosen <i>Lecturer</i>	Prof. Dr. Ir. Bangun Muljo Sukoco, DEA.DESS Prof. Mokhamad Nur Cahyadi, S.T., M.Sc., Ph.D.
Bahasa <i>Language</i>	Bahasa Indonesia dan Bahasa Inggris <i>Indonesian and English</i>
Relasi pada kurikulum <i>Relation to curriculum</i>	Mata kuliah wajib untuk Program Master Teknik Geomatika <i>Compulsory Courses for Master of Geomatics Engineering</i>
Tipe pertemuan, jam tatap muka <i>Type of teaching, contact hours</i>	Kuliah, 1.67 jam x 16 minggu per semester <i>Lecture, 1.67 hours x 16 weeks per semester</i>
Beban belajar <i>Workload</i>	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 Total = 82.72 jam <i>Lecture: 1.67 hours x 14 weeks = 23.38 hours</i> <i>Structured exercises and assignments: 4 hours x 14 weeks = 28 hours</i> <i>Independent activities: 4 hours x 14 weeks = 28 hours</i> <i>Exam: 1.67 hours x 2 time = 3.34 hours</i> <i>Total = 82.72 hours</i>
Kredit <i>Credits</i>	2 SKS 2 credits
Persyaratan sesuai dengan peraturan ujian <i>Requirements according to the examination regulations</i>	Minimum 80% kehadiran untuk mengikuti ujian tertulis <i>Minimum 80% attendance in this course in order to take the exams</i>

Deskripsi Mata Kuliah	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
<i>Description of Course</i>	<i>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.</i>
Capaian Pembelajaran / Course Learning Outcomes	<ol style="list-style-type: none"> 1. Mampu menelaskan dan mengidentifikasi konsep geometri dan macam-macam proyeksi. 2. Mampu mengaplikasikan transformasi koordinat dalam pemetaan dan konsep dasar untuk menyelesaikan persoalan proyeksi peta dalam geodesi. 3. Mampu melaporkan hasil percobaan dan hasil analisis secara tertulis dan lisan, bekerja mandiri dan bekerja sama dalam tim.
<i>Module objectives/ Course learning outcomes</i>	<i>1. Able to explain and identify geometric concepts and various types of projections.</i>

	<p>2. Able to apply coordinate transformations in mapping and basic concepts to solve map projection problems in geodesy.</p> <p>3. Able to report experimental results and analysis results in writing and orally, work independently and collaborate in a team.</p>																																								
CPMK dan hubungan dengan CPL Prodi <i>Learning outcomes and their corresponding to PLOs</i>	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <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> </thead> <tbody> <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> </tbody> </table>		PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	CLO.1				✓						CLO.2					✓					CLO.3						✓			
	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9																																
CLO.1				✓																																					
CLO.2					✓																																				
CLO.3						✓																																			
Mata kuliah wajib prasyarat <i>Mandatory prerequisites</i>	-																																								
Pokok Bahasan	<p>1. Konsep dasar geodesi terkait pemodelan matematis bumi berupa ellipsoida referensi dan bentuk geometris ellipsoida;</p> <p>2. Sistem koordinat, dan pemecahan persoalan Geodesi menggunakan metode langsung/ direct problem dan metode tidak langsung /inverse problem dengan cara Legendre dan Gausz;</p> <p>3. Macam-macam sistem proyeksi, pengertian faktor skala, transformasi sudut pada proyeksi konform, dan konvergensi meridian;</p> <p>4. Perhitungan pada sistem proyeksi dengan cara Polieder, Mercator, Transverse Mercator dan Universal Transverse Mercator;</p> <p>5. Transformasi Koordinat Geodesi ke Proyeksi Mercator dan sebaliknya;</p> <p>b. Transformasi Koordinat Geodesi ke Proyeksi UTM dan sebaliknya;</p> <p>1. <i>Basic geodetic concepts related to earth mathematical modeling of reference ellipsoids and geometric shapes of ellipsoids;</i></p> <p>2. <i>Coordinate system, and Geodetic problem solving using direct method and inverse problem by Legendre and Gausz;</i></p> <p>3. <i>Various projection systems, the definition of scale factor, angular transformation of conformational projection, and meridian convergence;</i></p> <p>4. <i>Calculation of the projection system by means of Polieder, Mercator, Transverse Mercator and Universal Transverse Mercator;</i></p>																																								
<i>Content</i>																																									

	<p>5. <i>Transforming Geodesy Coordinates to Mercator Projection and vice versa;</i> 6. <i>Geodetic Coordinate Transformation to UTM Projection and vice versa;</i></p>										
Pembelajaran dan Persyaratan Ujian <i>Study and examination requirements and forms of examination</i>	<table border="1"> <thead> <tr> <th>Rencana Evaluasi</th> <th>Bobot Weight</th> </tr> </thead> <tbody> <tr> <td>Tugas 1 <i>Excercise 1</i></td><td>25%</td></tr> <tr> <td>Tugas 2 <i>Excercise 2</i></td><td>25%</td></tr> <tr> <td>Evaluasi Tengah Semester <i>Mid Semester Exam</i></td><td>23%</td></tr> <tr> <td>Evaluasi Akhir Semester <i>Final Semester Exam</i></td><td>27%</td></tr> </tbody> </table>	Rencana Evaluasi	Bobot Weight	Tugas 1 <i>Excercise 1</i>	25%	Tugas 2 <i>Excercise 2</i>	25%	Evaluasi Tengah Semester <i>Mid Semester Exam</i>	23%	Evaluasi Akhir Semester <i>Final Semester Exam</i>	27%
Rencana Evaluasi	Bobot Weight										
Tugas 1 <i>Excercise 1</i>	25%										
Tugas 2 <i>Excercise 2</i>	25%										
Evaluasi Tengah Semester <i>Mid Semester Exam</i>	23%										
Evaluasi Akhir Semester <i>Final Semester Exam</i>	27%										
Media yang digunakan <i>Media employed</i>	Classical teaching tools with white board and power point presentation										
Daftar Pustaka <i>Reading list</i>	<ol style="list-style-type: none"> Richardus, Adler. <i>Map Projections for Geodetic, Cartographers, Geographers.</i> 1972. NHPC. Amsterdam. Bomford. <i>Geodesy.</i> 1975. Oxford University Press. MuljoSukojo, Bangun. <i>Hitung Proyeksi Geodesi,</i> 2004. Diktat ITS. Surabaya. Prihandito, Aryono. <i>Proyeksi Peta.</i> 1988. Penerbit Kanisius. Yogyakarta. Muryamto, Rochmad. <i>Hitungan Proyeksi Peta.</i> 1994. Diktat UGM. Yogyakarta. 										