PROGRAM STUDI MAGISTER TEKNIK GEOMATIKA

MASTER OF GEOMATICS ENGINEERING

BUKU PEDOMAN MATA KULIAH

COURSES MODULE HANDBOOK

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

DAFTAR PUSTAKA
(*TABLE OF CONTENT*)

DAFTAR PUSTAKA (*TABLE OF CONTENT*) i

PENDAHULUAN (*INTRODUCTION*) iii

Capaian Pembelajaran Lulusan (*Program Learning Outcomes*) iii

Struktur Mata Kuliah (*Course Structure*) v

Matriks CPL – Mata Kuliah (*PLO – Courses Matrix*) 1

MATA KULIAH WAJIB (*COMPULSORY COURSES*) 1

1. Aplikasi Statistika dan Probabilitas / *Applied Statistics and Probability* 1
2. Aplikasi Geodesi Satelit / *Applications of Satellite Geodesy* 5
3. Pemrograman Data Spasial / *Spatial Data Programming* 9
4. Sistem Koordinat dan Proyeksi Peta / *Coordinate Systems and Map Projections* 13
5. Kartografi dan Pemetaan Digital / *Cartography and Digital Mapping* 17
6. Sistem Informasi Geografi Lanjut / *Advanced Geographic Information Systems* 21
7. Analisa Citra Satelit Penginderaan Jauh / *Analysis of Remote Sensing Satellite Imagery* 26
8. Metodologi Penelitian / *Research Methodology* 31
9. Tesis / *Thesis* 34

MATA KULIAH PILIHAN (*ELECTIVE COURSES*) 37

1. Analisa Data Sistem Penentuan Posisi Global / *Global Navigation System Data Analysis* 37
2. Analisa Deformasi dan Geodinamika / *Deformation and Geodynamics Analysis* 40
3. Rekayasa Survei Data Terestris / *Terrestrial Data Management* 44
4. Aplikasi Geologi dan Geofisika / *Applied of Geology and Geophysics* 47
5. Pemodelan Gayaberat Bumi / *Earth Gravity Modelling* 49
6. Pengelolaan Infrastruktur Informasi Geospasial / *Management of Geospatial Information Structure* 52
7. Perencanaan Wilayah / *Urban and Regional Planning* 55
8. Fotografi Modern / *Modern Photogrammetry* 59
9. Konversi Data Spasial / *Spatial Data Conversion* 63
10. Sosio Ekonomi Spasial / *Socio Economic Spatial* 68
11. Pengelolaan Citra Resolusi Tinggi / *High Resolution Image Processing* 72
12. Kadaster Laut Lanjut / *Advanced Marine Cadastre* 77
13. Sistem Informasi Manajemen / *Management Information System* 80
14. Rekayasa Survei Hidrografi / *Applied Hydrographic Survey* 83
15. Oseanografi Fisik Lanjut / *Advanced Physical Oceanography* 88
16. Aspek Geodetik dalam Penentuan Hukum Laut / *Geodetic Aspects of Law of the Sea* 93
17. Pengembangan Pertanahan / *Cadastre and Land Management* 95
18. Sistem Informasi Perpajakan / *Tax Information System* 98

19. Sistem Administrasi Perpajakan / *Tax Adminstration System* 101
20. Sistem Pendaftaran Tanah / *Land Registration System* 104
21. Mitigasi Bencana / *Disaster Mitigation* 107

PENDAHULUAN
(*PREFACE*)

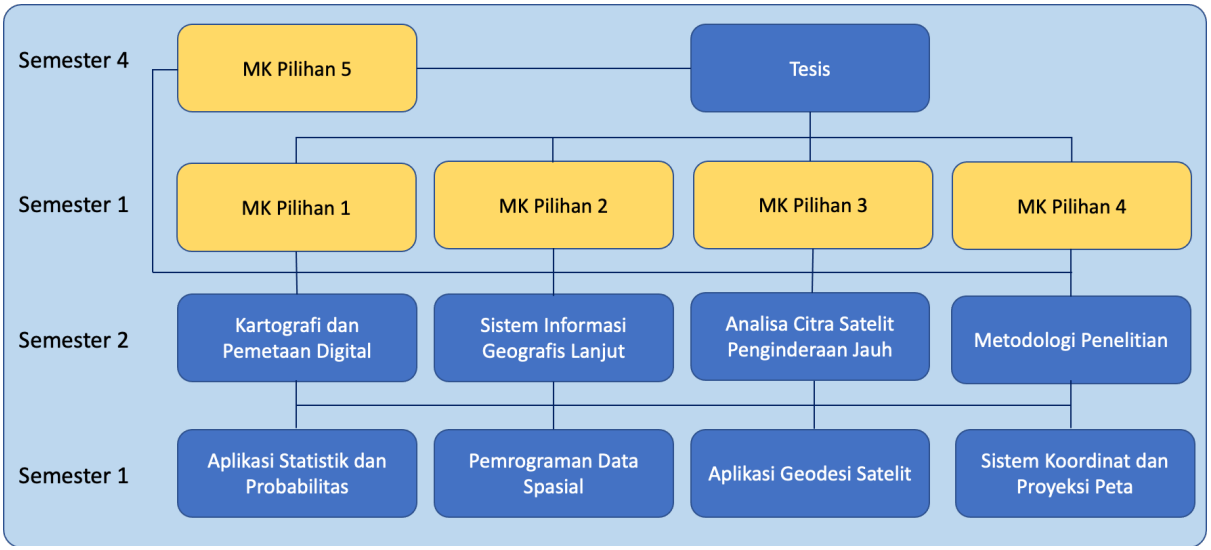
Capaian Pembelajaran Lulusan (*Program Learning Outcomes*)

Kode ***Code***	**Capaian Pembelajaran (CPL)** ***Program Learning Outcomes (PLO)***
CPL-01 *PLO-01*	Memiliki pengetahuan mendalam dan spesifik tentang metode matematika dan statistik, dan mampu menguasai, mengembangkan dan memanfaatkan model evaluasi yang kompleks dan terkini yang berkaitan dengan semua bidang teknik geomatika: geodesi & geodinamika; penginderaan jauh, GIS, dan fotogrametri; hidrografi & kelautan; dan surveying & kadaster *Having in-depth and specific knowledge of mathematical and statistical methods, and capable of accomplishing, developing, and making use of complex and novel evaluation models relating all areas of geomatics engineering, e.g., geodesy & geodynamics; remote sensing, GIS, and photogrammetry; hydrography & marine; and surveying & cadastre*
CPL-02 *PLO-02*	Mampu mengembangkan dan menerapkan ilmu dan teknologi kebumian dengan pendekatan interdisiplin dan multidisiplin yang mengintegrasikan hasil penelitian di bidang teknik geomatika: geodesi & geodinamika; penginderaan jauh, GIS, dan fotogrametri; hidrografi & kelautan; dan surveying & kadaster *Able to develop and apply the Earth science and technology with an interdisciplinary and multidisciplinary approach that integrates the results of research on the area of geomatics engineering, e.g., geodesy & geodynamics; remote sensing, GIS, and photogrammetry; hydrography & marine; and surveying & cadastre*
CPL-03 *PLO-03*	Mampu mengidentifikasi, menganalisis, mengembangkan dan menyediakan penggunaan alternatif ilmu dan teknologi dalam teknik geomatika: geodesi & geodinamika; penginderaan jauh, GIS, dan fotogrametri; hidrografi & kelautan; dan surveying & kadaster untuk mendukung pembangunan di era informasi dan globalisasi. *Able to identify, analyze, develop and provide an alternative use of science and technology in geomatics engineering, e.g., geodesy & geodynamics; remote sensing, GIS, and photogrammetry; hydrography & marine; and surveying & cadastre to support development in the information and globalization era.*
CPL-04 PLO-04	Mampu melakukan dan mengembangkan penelitian dan metode inovatif di bidang geomatika, baik yang ditujukan untuk pengembangan ilmu pengetahuan, atau untuk diterapkan. *Able to conduct and develop research and innovative methods in the field of geomatics, either aimed at the development of science or to be applied.*
CPL-05 *PLO-05*	Mampu mengelola penelitian untuk pengembangan yang bermanfaat bagi masyarakat dan ilmu pengetahuan, serta mampu mendapatkan pengakuan nasional dan internasional. *Able to manage research for expansion that is beneficial to society and science and able to get national and international recognition.*
CPL-06	Mampu mengembangkan pemikiran logis, kritis, sistematis, dan kreatif melalui penelitian ilmiah, penciptaan desain atau karya seni di bidang sains dan teknologi yang menyangkut dan menerapkan nilai humaniora sesuai dengan bidang keahliannya, mempersiapkan

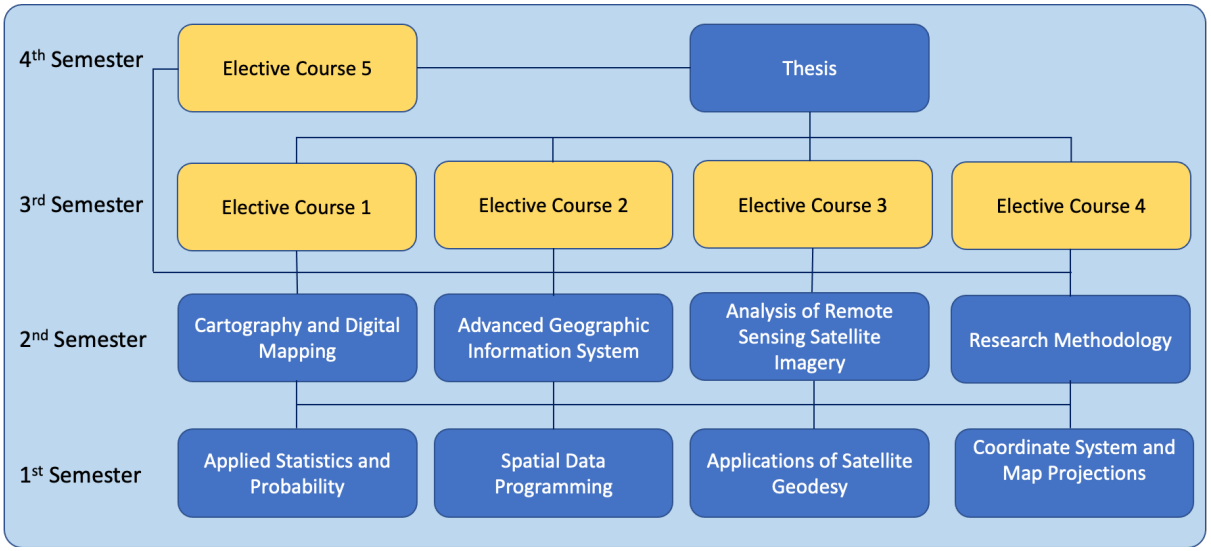
Kode *Code*	Capaian Pembelajaran (CPL) ***Program Learning Outcomes (PLO)***
	konsepsi ilmiah dan hasil studi berdasarkan aturan, prosedur dan etika ilmiah dalam bentuk tesis atau bentuk setara lainnya, dan diunggah di halaman perguruan tinggi, serta makalah yang diterbitkan dalam jurnal ilmiah terakreditasi atau diterima dalam jurnal internasional.
PLO-06	*Able to develop logical, critical, systematic, and creative thinking through scientific research, the creation of designs or works of art in the field of science and technology which concerns and applies the humanities value in accordance with their field of expertise, prepares scientific conception and result of study based on rules, procedures and scientific ethics in the form of a thesis or other equivalent form, and uploaded on a college page, as well as papers published in scientific journals accredited or accepted in international journals.*
CPL-07	Mampu beradaptasi dan bertransformasi seiring dengan perkembangan ilmu dan teknologi geospasial di lingkungan kerjanya.
PLO-07	*Able to adapt and transform along with the development of geospatial science and technology in its working environment.*
CPL-08	Mampu mengelola, mengembangkan dan memelihara jaringan dengan rekan kerja, rekan-rekan dalam lembaga yang lebih luas dan komunitas penelitian.
PLO-08	*Capable of managing, developing, and maintaining networking with colleagues, peers within the broader institutes, and research community.*
CPL-09	Mampu melakukan validasi akademik atau studi sesuai dengan bidang keahliannya dalam memecahkan masalah di masyarakat atau industri yang relevan melalui pengembangan pengetahuan dan keahlian.
PLO-09	*Able to perform academic validation or studies in accordance with their areas of expertise in solving problems in relevant communities or industries through the development of knowledge and expertise.*
CPL-10	Menginternalisasi semangat kemandirian, kejuangan, dan kewirausahaan.
PLO-10	*Internalizing spirit of independence, struggle, and entrepreneurship.*
CPL-11	*Memiliki moral, etika, kepribadian dan komunikasi yang baik dalam setiap kegiatan dengan menghormati keragaman budaya, pandangan, kepercayaan, dan agama.*
PLO-11	*Have good morals, ethics, personality, and communication skill in each activity with respect for cultural diversity, views, beliefs, and religious attitude.*
CPL-12	Menunjukkan sikap tanggung jawab pada pekerjaan di bidang keahliannya secara mandiri dan dalam tim interdisiplin.
PLO-12	*Demonstrating an attitude of responsibility on work in their field of expertise independently and within an interdisciplinary team.*

Struktur Mata Kuliah (*Course Structure*)

Peta Kurikulum Magister Teknik Geomatika



Curriculum map of Master of Geomatics Engineering



Struktur Kurikulum / *Course Structure*

No	Kode *Code*	Nama Mata Kuliah *Course Name*	sks *credits*
SEMESTER I			
1	RM185101	Aplikasi Statistik dan Probabilitas *Applied Statistics and Probability*	2
2	RM185102	Aplikasi Geodesi Satelit *Applications of Satellite Geodesy*	2
3	RM185103	Pemrogram Data Spasial *Spatial Data Programming*	2
4	RM185104	Sistem Koordinat dan Proyeksi Peta *Coordinate Systems and Map Projections*	2
SEMESTER II			
5	RM185201	Kartografi dan Pemetaaan Digital *Cartography and Digital Mapping*	2
6	RM185202	Sistem Informasi Geografis Lanjut *Advanced Geographic Information Systems*	3
7	RM185203	Analisa Citra Satelit Penginderaan Jauh *Analysis of Remote Sensing Satellite Imagery*	3
8	RM185204	Metodologi Riset Research Methodology	2
SEMESTER III			
9		Mata kuliah Pilihan *Elective Course*	2
10		Mata kuliah Pilihan *Elective Course*	2
11		Mata kuliah Pilihan *Elective Course*	2
12		Mata kuliah Pilihan *Elective Course*	2
SEMESTER IV			
13		Mata kuliah Pilihan *Elective Course*	2
14	RM185401	Tesis Thesis	8
Total Credits			36

Daftar Mata Kuliah Pilihan / *List of Elective Courses*

No	Kode *Code*	Nama Mata Kuliah *Course Name*	sks *credits*
1	RM185901	Analisa Data Sistem Penentuan Posisi Global *Global Navigation Satellite System Data Analysis*	2
2	RM185902	Analisa Deformasi dan Geodinamika *Deformation and Geodynamics Analysis*	2
3	RM185903	Rekayasa Data Survei Terestris *Terrestrial Data Management*	2
4	RM185904	Aplikasi Geologi dan Geofisika *Applied of Geology and Geophysics*	2
5	RM185905	Pemodelan Gayaberat Bumi *Earth Gravity Modelling*	2
6	RM185906	Pengelolaan Infrastruktur Informasi Geospasial *Management of Geospatial Information Infrastructure*	2
7	RM185907	Perencanaan Wilayah *Urban and Regional Planning*	2
8	RM185908	Fotogrametri Modern *Modern Photogrammetry*	2
9	RM185909	Konversi Data Spatial *Spatial Data Conversion*	2
10	RM185910	Sosio Ekonomi Spasial *Socio-Economic Spatial*	2
11	RM185911	Pengolahan Citra Resolusi Tinggi *High Resolution Image Processing*	2
12	RM185912	Kadaster Laut Lanjut *Advanced Marine Cadastre*	2
13	RM185913	Sistem Informasi Manajemen *Management Information System*	2
14	RM185914	Rekayasa Survei Hidrografi *Applied Hydrographic Survey*	2
15	RM185915	Oseanografi Fisik Lanjut *Advanced Physical Oceanography*	2
16	RM185916	Aspek Geodetik dalam Penentuan Hukum Laut *Geodetic Aspects of Law of the Sea*	2
17	RM185917	Pengembangan Pertanahan *Cadastre and Land Management*	2
18	RM185918	Sistem Informasi Perpajakan *Tax Information System*	2
19	RM185919	Sistem Administrasi Perpajakan *Tax Administration System*	2
20	RM185920	Sistem Pendaftaran Tanah *Land Registration System*	2
21	RM185921	Eksplorasi Cebakan Mineral *Mineral Deposit Exploration*	2
22	RM185922	Eksplorasi Geotermal *Geothermal Exploration*	2
23	RM185923	Geofisika Lingkungan dan Geoteknik *Environmental Geophysics and Geotechnics*	2

No	Kode *Code*	Nama Mata Kuliah *Course Name*	sks *credits*
24	RM185924	Mitigasi Bencana *Disaster Mitigation*	2
25	RM185925	Pengolahan Data Seismik *Seismic Data Processing*	2
26	RM185926	Eksplorasi Seismik *Seismic Exploration*	2
27	RM185927	Seismik dan Sequence Statigrafi *Seismic and Stratigraphy Sequence*	2
28	RM185928	Eksplorasi Medan Potensial & Elektromagnetik Bumi *Earth Electromagnetics and Potensial Field Exploration*	2

Daftar Mata Kuliah Pilihan Berdasarkan Bidang Minat

Geodesi & Geodinamika	Penginderaan Jauh, Remote Sensing & Fotogrametri	Surveying & Kadaster	Hidrografi & Kadaster
Analisa Data Sistem Penentuan Posisi Global	Pengelolaan Infrastruktur Informasi Geospasial	Rekayasa Survei Data Terestris	Kadaster Laut Lanjut
Analisa Deformasi dan Geodinamika	Perencanaan Wilayah	Pengembangan Pertanahan	Rekayasa Survei Hidrografi
Pemodelan Gayaberat Bumi	Fotogrametri Modern	Sistem Informasi Perpajakan	Rekayasa Survei Hidrografi
	Konversi Data Spasial	Sistem Administrasi Perpajakan	Aspek Geodetik dalam Penentuan Hukum Laut
	Sosio Ekonomi Spasial	Sistem Pendaftaran Tanah	
	Pengolahan Citra Resolusi Tinggi	Sistem Informasi Manajemen	

List of elective courses based on four areas of specialist

Geodesy & Geodynamics	*Remote Sensing, GIS, & Photogrammetry*	*Surveying & Cadastre*	*Hydrography & Marine*
Global Navigation Satellite System Data Analysis	*Management of Geospatial Information Infrastructure*	*Terrestrial Data Management*	*Advanced Marine Cadastre*
Deformation and Geodynamics Analysis	*Urban and Regional Planning*	*Cadastre and Land Management*	*Applied Hydrographic Survey*
Earth Gravity Modelling	*Modern Photogrammetry*	*Tax Information System*	*Advanced Physical Oceanography*
	Spatial Data Conversion	*Tax Administration System*	*Geodetic Aspects of Law of the Sea*
	Socio-Economic Spatial	*Land Registration System*	
	High Resolution Image Processing	*Management Information System*	
	Management Information System		

Matriks CPL – Mata Kuliah (*PLO – Courses Matrix*)

CPL ***PLO***	**Mata Kuliah / *Course***													
	Semester 1				**Semester 2**				**Semester 3**				**Semester 4**	
	Aplikasi Statistik dan Probabilitas/ *Applied Statistics and Probability*	Aplikasi Geodesi Satelit / *Applied Satellite Geodesy*	Sistem Koordinat & Proyeksi Peta / *Coordinate System and Map Projection*	Pemrograman Data Spasial / *Spatial Data Programming*	Kartografi & Pemetaan Dijital / *Cartography & Digital Mapping*	Sistem Informasi Geografis Lanjut / *Advanced Geographic Information System*	Analisa Citra Satelit Penginderaan Jauh / *Analysis of Remote Sensing Satellite Imagery*	Metodologi Penelitian / *Metodologi Riset*	Pilihan 1 / *Elective 1*	Pilihan 2 1 / *Elective 2*	Pilihan 3 1 / *Elective 3*	Pilihan 4 1 / *Elective 4*	Pilihan 51 / *Elective 5*	Tesis / *Thesis*
CPL-01 *PLO-01*	✓		✓	✓			✓							
CPL-02 *PLO-02*		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
CPL-03 *PLO-03*		✓	✓	✓		✓	✓	✓						
CPL-04 *PLO-04*	✓			✓			✓							✓
CPL-05 *PLO-05*								✓						✓
CPL-06 *PLO-06*					✓	✓		✓						✓
CPL-07 *PLO-07*		✓		✓		✓								
CPL-08 *PLO-08*														
CPL-09 *PLO-09*	✓				✓									✓
CPL-10 *PLO-10*														✓
CPL-11 *PLO-11*														✓
CPL-12 *PLO-12*														✓

MATA KULIAH WAJIB
(*COMPULSORY COURSES*)

1. Aplikasi Statistika dan Probabilitas / *Applied Statistics and Probability*

Nama modul *Module name*	**Aplikasi Statistika dan Probabilitas** *Applied Statistics and Probability*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185101
Mata kuliah *Course*	Aplikasi Statistika dan Probabilitas *Applied Statistics and Probability*
Semester *Semester*	I (satu) *I (one)*
Penanggung jawab mata kuliah *Person responsible for the module*	Ira Mutiara Anjasmara
Dosen *Lecturer*	Ira Mutiara Anjasmara Danar Guruh Pratomo
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 matakuliah ini mahasiswa akan mereview kembali konsep statistika dan probabilitas serta mengaplikasikannya pada persoalan-persoalan di bidang geomatika. Selain itu mahasiswa juga diharapkan dapat mengaplikasikan tes statistik terutama sebagai validasi dalam penelitian. Mahasiswa juga akan mempelajari analisa regresi (trend analisis) untuk melakukan aproksimasi dan prediksi baik untuk data bivariate maupun multi variat dalam bidang geomatika. Analisa statistik untuk spasial-temporal data juga akan dipelajari dan diaplikasikan. *In this course, students will review the concepts of statistics and probability and apply them to problems in the field of geomatics. In addition, students are also expected to be able to apply statistical tests, especially as validation in research. Students will also learn regression analysis (trend analysis) to make approximations and predictions for both bivariate and multivariate data in the field of geomatics. Statistical analysis for spatial-temporal data will also be studied and applied.*
Capaian Pembelajaran / Course *Learning Outcomes* *Module objectives / course learning outcomes*	1. Mampu menerapkan teori dasar statistika dan probabilitas dalam persoalan dalam bidang geomatika. 2. Mampu menerapkan tes statistik dalam persoalan daalam bidang geomatika. 3. Mampu menerapkan analisa regresi untuk aproksimasi dan prediksi baik untuk data bivariate maupun multivariate dalam persoalan di bidang geomatika. 4. Mampu melakukan time-series analysis untuk persoalan dalam bidang geomatika. 5. Mampu menerapkan metode statistika untuk analisa data spasial-temporal dalam persoalan di bidang geomatika. *1. Able to apply the basic theory of statistics and probability in problems in the field of geomatics.* *2. Able to apply statistical tests in problems in the field of geomatics.* *3. Able to apply regression analysis for approximation and prediction for both bivariate and multivariate data in problems in the field of geomatics.*

	4. *Able to perform time-series analysis for problems in the field of geomatics.* 5. *Able to apply statistical methods for spatial-temporal data analysis in problems in the field of geomatics.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2	✓								✓			
CLO.3									✓			
CLO.4				✓								
CLO.5				✓					✓			

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Data Statistik, Distribusi Frekuensi, Ukuran Nilai Pusat, Regresi linier dan multivariable, Korelasi dan kovariansi, Aplikasi pengolahan data dan penyajian data metode analisa geostatistical (SIG), Aplikasi pengolahan data uji ketelitian citra satelit (Penginderaan Jauh), Probabilitas, Distribusi Normal, Disribusi t-student dan chi-square, Interval kepercayaan, Estimasi rata-rata dan variansi, Uji Statistik rata-rata dan variansi, Aplikasi pengujian data untuk SIG dan Penginderaan Jauh. *Statistical Data, Frequency Distribution, Central Values Size, Linear Regression and Multivariable, Correlation and Covariance, Data processing application and data presentation of geostatistical analysis method (GIS), Satellite Imagery Satisfaction Test, Satisfaction Probability, Normal Distribution, Distribution t-student and chi-square, Confidence interval, Average estimation and variance, Average statistical and variance test, Data testing application for GIS and Remote Sensing.*
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	**Bobot** ***Weight***
Tugas dan presentasi 1 *Assignments and presentation 1*	10%
Tugas dan presentasi 2 *Assignments and presentation 2*	15%
Evaluasi Tengah Semester *Mid Semester Exam*	20%
Tugas dan presentasi 3 *Assignment and presentation 3*	25%
Tugas dan presentasi 4 *Assigment and presentation 4*	30%

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	1. Johnson, R.A. and Bhattacharyya, G.K. 2010. Statistics Principles and Methods 6th Ed. 2. John Wiley & Sons. Mikhail,E.M., 1976. Analysis and Adjustment of Survey Measurements. Dun Donnelley Publisher New York. 3. Ghilani, C. and Wolf, P.R. 2006. Adjustment Computations: Spatial Data Analysis 4th Ed. 4. John Wiley & Sons. Heigerger, R.M. and B. Holland. 2009. Statistical Analysis and Data Display. 5. Springer Hengl, T. 2009. A Practical Guide to Geostatistical Mapping. Office for Official Publications of the European Communities, Luxembourg.

2. Aplikasi Geodesi Satelit / *Applications of Satellite Geodesy*

Nama modul *Module name*	**Aplikasi Geodesi Satelit** *Applications of Satellite Geodesy*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185102
Mata kuliah *Course*	Aplikasi Geodesi Satelit *Applications of Satellite Geodesy*
Semester *Semester*	I (satu) *I (one)*
Penanggung jawab mata kuliah *Person responsible for the module*	Eko Yuli Handoko
Dosen *Lecturer*	Mokhamad Nur Cahyadi Eko Yuli Handoko
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Aplikasi Geodesi Satelit merupakan salah satu mata kuliah wajib. Pendalaman atau jenjang magister

Description of Course	mempelajari mata kuliah ini apalagi penerapannya sangat penting. Dalam mata kuliah Aplikasi Geodesi Satelit mahasiswa akan diberikan pengetahuan tentang tujuan dan pengembangan sistem satelit. Pengetahuan tentang sistem koordinat, sistem orbit dan perambatan sinyal diberikan agar mahasiswa mampu memahami dan menjelaskan konsep dasar satelit geodesi. Sistem satelit geodesi untuk ilmu geodesi akan diberikan dan mahasiswa diharapkan mampu berpikir kreatif tentang pemanfaatan sistem satelit dalam pengembangan teknologi informasi geospasial. *The application of Satellite Geodesy is one of the mandatory courses. The deepening or master's level of studying this subject, let alone its application, is very important. In the Satellite Geodetic Application course, students will be given knowledge about the purpose and development of satellite systems. Knowledge of the coordinate system, orbital system and signal propagation is provided so that students are able to understand and explain the basic concepts of geodetic satellites. Geodetic satellite systems for geodetic science will be provided and students are expected to be able to think creatively about the use of satellite systems in the development of geospatial information technology.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mampu menjelaskan tujuan dan perkembangan satelit geodesi. 2. Mampu menjelaskan konsep dasar dari sistem satelit yang meliputi sistem koordinat, sistem orbit, dan propagasi sinyal. 3. Mampu menjelaskan tentang sistem satelit yang digunakan untuk keperluan ilmu geodesi. 4. Mampu menganalisa penggunaan sistem satelit geodesi dalam pengembangan teknologi informasi geospasial. 5. Melaporkan hasil percobaan dan hasil analisis secara tertulis dan lisan, bekerja mandiri dan bekerja sama dalam tim.
Module objectives / Course learning outcomes	*1. Able to explain the purpose and development of geodetic satellites.* *2. Able to explain the basic concepts of satellite systems which include coordinate systems, orbit systems, and signal propagation.* *3. Able to explain about the satellite system used for geodetic science purposes.*

<table>
<tr><td></td><td>4. Able to analyze the use of geodetic satellite systems in the development of geospatial information technology.
5. 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><td></td><td>PLO.1</td><td>PLO.2</td><td>PLO.3</td><td>PLO.4</td><td>PLO.5</td><td>PLO.6</td><td>PLO.7</td><td>PLO.8</td><td>PLO.9</td><td>PLO.10</td><td>PLO.11</td><td>PLO.12</td></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

<table>
<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
Presentation</td><td>10%</td></tr>
<tr><td>Evaluasi Tengah Semester
Mid Term Exam</td><td>30%</td></tr>
<tr><td>Tugas Kelompok
Team based Assignment</td><td>30%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Exam</td><td>30%</td></tr>
</table>
</td>
</tr>
<tr>
<td>Media yang digunakan
Media employed</td>
<td>Classical teaching tools with white board and power point presentation</td>
</tr>
<tr>
<td>Daftar Pustaka
Reading list</td>
<td>1. Seeber, G. (1993). Satellite Geodesy, Foundations, Methods and Applications. Berlin. New York: Walter de Gruyter.
2. Kaula, W.M. (2000). Theory of Satellite Geodesy. New York: Dover Publications, Inc.
3. Abidin, H.Z. (2001). Geodesi Satelit. P.T. Pradnya Paramita, Jakarta. ISBN 979-408-462-X.219 pp.
4. Torge, W. 2001. Geodesy. 3rd ed. Berlin: Walter de Gruyter.</td>
</tr>
</table>

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*	RM185103
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
Dosen *Lecturer*	Bangun Muljo Sukojo Hepi Hapsari Handayani
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Pada mata kuliah ini, mahasiswa akan mempelajari dasar pemrograman, konsep dasar data spasial,

Description of Course	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*	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.
Module objectives/Course learning outcomes	*1. Students are able to perform data processing and analysis based on graphs and table in order to solve simple problems related to spatial.* *2. Students are able to perform the basics of matrix data processing and apply it in the 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 perform data processing and analysis based on spatio-temporal data.* *5. Students are able to perform data processing and analysis based on classification of satellite remote sending data.*

CPMK dan hubungan dengan CPL Prodi
Learning outcomes and their corresponding to PLOs

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2				✓								
CLO.3				✓								
CLO.4							✓					
CLO.5							✓					

Mata kuliah wajib prasyarat
Mandatory prerequisites

-

Pokok Bahasan

- 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.
- 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.

Content

- *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.*
- *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.*

Pembelajaran dan Persyaratan Ujian
Study and examination requirements and forms of examination

Rencana Evaluasi	**Bobot** ***Weight***
Evaluasi Tengah Semester *Mid Term Exam*	15%
Tugas studi kasus *Assignment of case based*	30%
Kuis *Cognitive Quiz*	20%
Tugas besar proyek *Project based assignment*	35%

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.

4. 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 *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 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. 5. Mampu melaporkan hasil percobaan dan hasil analisis secara tertulis dan lisan, bekerja mandiri dan bekerja sama dalam tim.

Module objectives/ Course learning outcomes	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.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2	✓											
CLO.3		✓										
CLO.4		✓										
CLO.5			✓									

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan	• 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;
Content	• *Basic geodetic concepts related to earth mathematical modeling of reference ellipsoids and geometric shapes of ellipsoids;* • *Coordinate system, and Geodetic problem solving using direct method and inverse problem by Legendre and Gausz;*

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- *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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Pembelajaran dan Persyaratan Ujian
Study and examination requirements and forms of examination

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<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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Media yang digunakan
Media employed

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Classical teaching tools with white board and power point presentation

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<tr><td>

Daftar Pustaka
Reading list

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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.

</td></tr>
</table>

5. Kartografi dan Pemetaan Digital / *Cartography and Digital Mapping*

Nama modul *Module name*	**Kartografi dan Pemetaan Digital** *Cartography and Digital Mapping*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185201
Mata kuliah *Course*	Kartografi dan Pemetaan Digital *Cartography and Digital Mapping*
Semester *Semester*	II (dua) *II (two)*
Penanggung jawab mata kuliah *Person responsible for the module*	Noorlaila Hayati
Dosen *Lecturer*	Noorlaila Hayati Teguh Hariyanto
Bahasa *Language*	Bahasa Indonesia dan Bahasa Inggris *Indonesian and English*
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 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 tentang konsep Kartografi yang meliputi pengertian Peta dan sejarah peta. Pengertian peta yang dimaksud adalah arti peta, penggolongan peta menurut sifat, macam dan jenisnya. Setelah mengetahui arti peta, maka prosedur pembuatan peta diajarkan yaitu proses pemetaan yang terdiri dari: pengambilan data, pengolahan data dan penyajian data. Selanjutnya, mahasiswa akan mempelajari dan menelaah perkembangan kartografi dalam teknologi saat ini yang biasa disebut sebagai pemetaan digital. Mahasiswa diharapkan dapat mengimplementasikan peta dasar dan peta tematik dalam produk dokumen digital dan dapat divisualisasikan secara interaktif via online. *In this course, students will learn the concept of Cartography such as the understanding of maps and the history of maps. It includes the meaning of the map, the classification of maps, and the types of maps. Furthermore, students learn the procedure for making maps, namely the mapping process which consists of data collection, data processing, and data presentation. Furthermore, students will study and examine the development of cartography in today's technology which is commonly referred to as digital mapping. Students are expected to be able to implement base maps and thematic maps in digital document products and can be visualized interactively using the internet.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mampu menjelaskan konsep tentang Kartografi, meliputi arti peta, posisi suatu tempat dan tujuan kartografi. 2. Mampu membedakan peta yang beredar di masyarakat. 3. Mampu menjelaskan prosedur pembuatan peta secara complex. 4. Mampu membuat peta tematik dari serangkaian data yang tersedia (data sekunder). 5. Mampu menjelaskan analitik dan otomatisasi kartografi. 6. Mampu memahami konsep peta tematik dalam 2D dan 3D.

Module objectives/Course learning outcomes	7. Mampu menjelaskan aplikasi pemetaan digital beserta cara visualisasinya. 8. Mampu memahami perkembangan mutakhir teknologi pemetaan digital. 1. *Able to explain the concept of cartography including the meaning of maps, the position of a place and the purpose of cartography.* 2. *Able to distinguish maps circulating in the community.* 3. *Able to explain the procedure of making a map in a complex term.* 4. *Able to create thematic maps from a set of available data (secondary data).* 5. *Able to explain cartographic analytics and automatic cartography.,* 6. *Able to understand the concept of thematic maps in 2D and 3D.* 7. *Able to explain digital mapping applications and how to visualize them.* 8. *Able to understand the latest developments in digital mapping technology.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓										
CLO.2		✓										
CLO.3						✓						
CLO.4		✓										
CLO.5						✓						
CLO.6									✓			
CLO.7									✓			
CLO.8									✓			

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Konsep Kartograf, penggolongan peta, prosedur pembuatan peta, pemahaman tentang skala, system koordinat, plotting Koordinat: pengertian koordinat kartesian, geografis, sistem koordinat, desain tata letak pada peta. *Cartographic concept, map classification, mapmaking procedure, understanding of scale, coordinate system, coordinate plotting, cartesian coordinate definition, geographic, coordinate system, layout design on map.*

<table>
<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>Membuat peta dasar di wilayah domisili
Create a base map in students’s region</td><td>10%</td></tr>
<tr><td>Presentasi peta tematik dari peta riil
Present thematic maps from real data</td><td>20%</td></tr>
<tr><td>Mempresentasikan contoh aplikasi BIM
Mid Semester Exam</td><td>10%</td></tr>
<tr><td>Membuat dan presentasi web mapping
Create and present web mapping</td><td>20%</td></tr>
<tr><td>Evaluasi Tengah Semester
Middle Term Examination</td><td>20%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Examination</td><td>20%</td></tr>
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</tr>
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<td>Media yang digunakan
Media employed</td>
<td>Classical teaching tools with white board and power point presentation</td>
</tr>
<tr>
<td>Daftar Pustaka
Reading list</td>
<td>1. Villanueva, K.J. 1984. Kartografi. Jurusan Teknik Geodesi FTSP ITB. Bandung.
2. Wolf, Paul, R. 1974. Elementary of Photogrametry
3. Kraak, MJ.,Omerling, J. 1996. Cartography Petzation of spatial data.Prentice Hall.London
4. Yuwono, 2009. Kartografi. Prodi teknikGeomatika ITS. 2009. Surabaya</td>
</tr>
</table>

6. Sistem Informasi Geografi Lanjut / *Advanced Geographic Information Systems*

Nama modul *Module name*	**Sistem Informasi Geografi Lanjut** *Advanced Geographic Information Systems*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185202
Mata kuliah *Course*	Sistem Informasi Geografi Lanjut *Advanced Geographic Information Systems*
Semester *Semester*	II (dua) *II (two)*
Penanggung jawab mata kuliah *Person responsible for the module*	Hepi Hapsari Handayani
Dosen *Lecturer*	Hepi Hapsari Handayani 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: 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*	Dalam mata kuliah ini, mahasiswa akan belajar tentang sistem informasi geografis dalam pemanfaatannya lebih lanjut meliputi fundamental SIG, spasial statistik, spasial analisis yang berbasis vektor dan raster, serta pemodelan spasial. Selain itu, mahasiswa juga diharapkan dapat mengembangkan Multi-Criteria Decision Analysis (MCDA) berbasis GIS untuk berbagai aplikasi. Dalam kuliah ini juga akan disajikan studi kasus, sehingga mahasiswa memiliki pengalaman belajar untuk berpikir kritis tentang pemanfaatan dan pengembangan teknologi SIG di beberapa bidang seperti perencanaan dan pemanfaatan lingkungan, administrasi perencanaan, dan pembangunan infrastruktur lainnya serta mampu untuk memberikan keputusan yang tepat tentang penggunaan dan pengembangan lebih lanjut dari teknologi GIS dalam kehidupan. Mahasiswa akan memiliki pengetahuan tentang cara menyusun, memproses, menganalisis, menerapkan data spasial dan atribut, serta melakukan kontrol kualitas untuk analisis data dalam GIS. Penerapan GIS berbasis web (Web-GIS) dan penggunaan data berbasis cloud/crowdsourcing data dalam SIG open-source akan diperkenalkan dalam mata kuliah ini. *In this course, students will learn and apply the main objectives of Advanced GIS, including key GIS, spatial statistics, and analysis principles containing vector and raster-based, and spatial modeling. Additionally, students have to develop Multi-Criteria Decision Analysis (MCDA) in GIS-based for various applications. In this lecture, case studies will also be presented, so that students will have a learning experience to think critically about the utilization and development of GIS technology in several fields such as environmental planning and utilization, planning administration, and other infrastructure development and being able to provide the right decisions about the use and further development of GIS technology in life. Students will have knowledge of how to compile, process, analyze, apply spatially and attribute data, and test quality control for data analysis in GIS. The application of web-based GIS (Web-GIS) and the use of cloud-based data/data crowdsourcing in open-source GISS will be introduced in this course.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mahasiswa mampu menerapkan konsep analisa statistika dan spasial dalam Sistem Informasi Geografis sehingga mampu berfikir secara kritis

	tentang pemanfaatan teknologi SIG untuk beberapa studi kasus berdasarkan pemahaman tentang prinsip, proses, aplikasi dan pengembangan SIG, serta mengungkapkan ide atau gagasan mereka secara lisan dan tertulis dalam bentuk makalah seminar dan jurnal. 2. Mahasiswa mampu mengembangkan dan menerapkan metode dalam spasial modelling baik menggunakan konsep prediksi maupun normative secara sederhana berdasarkan data SIG baik berbasis vector maupun raster berdasarkan berbagai aspek dapat meliputi aspek fisik, sosial, ekonomi, dll. 3. Mahasiswa mampu menerapkan metode MCDA berbasis SIG serta menyusun parameter-parameter yang terlibat dalam penyelesaian studi kasus berdasarkan teknik pembobotan yang tepat seperti rangking, rating atau machine learning, sehingga dapat menganalisis metode yang tepat untuk terapan dalam bidang seperti perencanaan, lingkungan, kebencanaan, ekonomi, pembangunan infrastruktur, dll. 4. Mahasiswa mampu merepresentasikan hasil dan analisa yang dilakukan pada bidang terapan sebagai studi kasus dalam sistem berbasis web (WeBGIS) dengan memanfaatkan platform opensource GIS. 5. Mahasiswa mampu melakukan analisa untuk uji kontrol kualitas terhadap seluruh proses yang dilakukan dalam penerapan atau pengembangan SIG dalam terapan untuk studi kasus.
Module objectives/ Course learning outcomes	*1. Students are able to apply statistical and spatial analysis methods in GIS therefore they are able to think critically about the use of GIS technology for several case studies based on an understanding of the principles, processes, applications, and development of GIS, then present the proposed idea by verbal or written in the article of seminar and journal.* *2. Students are able to develop and apply methods in spatial modeling using both predictive and normative concepts simply based on GIS data, both vector-based and raster-based on various aspects including physical, social, economic, etc.* *3. Students are able to apply the GIS-based MCDA method and compile the parameters involved for accomplishment case studies based on appropriate weighting techniques such as ranking, rating, or machine learning, thus, they can analyze using the*

	suitable method for application in various areas such as planning, environment, disaster, economics, infrastructure development, etc. 4. *Students are able to present the results and analyses carried out in the applied subjects as case studies by utilizing a web-based system and the open-source GIS platform.* 5. *Students are able to perform the analysis for quality control tests on each process carried out in the development of the GIS application.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓										
CLO.2		✓	✓									
CLO.3												
CLO.4						✓	✓					

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Komponen SIG, Data Konversi SIG, Topologi data, Sistem Basis Data Spasial dan non spasial, analisa spasial dan non spasial SIG, pengembangan SIG dan aplikasinya. *GIS Components, GIS Conversion Data, Data Topology, Spatial and nonspatial Database System, Spatial and nonspatial analysis of GIS, GIS development and application.*
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	**Bobot** ***Weight***
Evaluasi Tengah Semester *Midterm Exam*	25%
Hasil Proyek *Team based project*	30%
Studi Kasus *Case Method*	25%
Kuis *Cognitive Quiz*	20%

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	1. Villanueva, K.J. 1984. *Kartografi.* Jurusan Teknik Geodesi FTSP ITB. Bandung. 2. Wolf, Paul, R. 1974. *Elementary of Photogrammetry* 3. Kraak, MJ., Omerling, J. 1996. *Cartography*

	Petzation of spatial data. Prentice-Hall. London Yuwono, 2009. *Kartografi*. Prodi teknikGeomatika ITS. 2009. Surabaya

7. Analisa Citra Satelit Penginderaan Jauh / *Analysis of Remote Sensing Satellite Imagery*

Nama modul *Module name*	**Analisa Citra Satelit Penginderaan Jauh** *Analysis of Remote Sensing Satellite Imagery*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185203
Mata kuliah *Course*	Analisa Citra Satelit Penginderaan Jauh *Analysis of Remote Sensing Satellite Imagery*
Semester *Semester*	II (dua) *II (two)*
Penanggung jawab mata kuliah *Person responsible for the module*	Bangun Muljo Sukojo
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, 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*	Pengertian Dasar, Landasan Interpretasi, Kunci Interpretasi, Macam, Cara/Metode, Proses, Alat, Data/Dokumen Interpretasi. Peralatan dasar Penginderaan Jauh (pengolahan citra) untuk menghitung dan menginterpretasi citra satelit. kegiatan informasi geospasial metode Penginderaan Jauh dengan membuat persyaratan pekerjaan, membuat orbit satelit. aplikasi citra satelit penginderaan jauh. *Basic Understanding, Foundation of Interpretation, Key to Interpretation, type, Methods/Methods, Processes, Tools, Data/Interpretation Documents. Basic Remote Sensing (image processing) equipment for calculating and interpreting satellite imagery. geospatial information activities of remote sensing methods by creating work requirements, creating satellite orbits. remote sensing satellite imagery application.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	1. Mampu memahami sejarah dan konsep dasar penginderaan jauh dan perkembangan ilmu dan teknologi informasi geospasial mutakhir/terkini di bidang geodesi dan surveying, geodinamik dan lingkungan, geospasial, geomarin, serta pertanahan. 2. Memiliki keterampilan dalam memproses data citra penginderaan jauh dan perkembangan ilmu dan teknologi informasi geospasial mutakhir/terkini di bidang geodesi dan surveying, geodinamik dan lingkungan, geospasial, geomarin, serta pertanahan. 3. Memiliki keterampilan dalam memproses kalibrasi radiometrik, koreksi geometrik dan perkembangan ilmu dan teknologi informasi geospasial mutakhir/terkini di bidang geodesi dan surveying, geodinamik dan lingkungan, geospasial, geomarin, serta pertanahan. 4. Mampu melakukan interpretasi dan klasifikasi citra satelit dan perkembangan ilmu dan teknologi informasi geospasial mutakhir/terkini di bidang geodesi dan surveying, geodinamik dan lingkungan, geospasial, geomarin, serta pertanahan. *1. Able to understand the history and basic concepts of remote sensing and the development of cutting-edge/up-to-date geospatial information science and technology in the fields of geodesy and surveying, geodynamics and environment, geospatial, geomarin, and land.* *2. Have skills in processing remote sensing image data and the development of state-of-the-art geospatial*

<table>
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information science and technology in the fields of geodesy and surveying, geodynamics and environment, geospatial, geomarin, and land.

3. *Have skills in processing remote sensing image data and the development of state-of-the-art geospatial information science and technology in the fields of geodesy and surveying, geodynamics and environment, geospatial, geomarin, and land.*
4. *Able to interpret and classify satellite imagery and the development of the latest /latest geospatial information science and technology in the field of geodesy and surveying, geodynamics and environment, geospatial, geomarin, and land.*

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CPMK dan hubungan dengan CPL Prodi

Learning outcomes and their corresponding to PLOs

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<table>
<tr><td></td><td>PLO.1</td><td>PLO.2</td><td>PLO.3</td><td>PLO.4</td><td>PLO.5</td><td>PLO.6</td><td>PLO.7</td><td>PLO.8</td><td>PLO.9</td><td>PLO.10</td><td>PLO.11</td><td>PLO.12</td></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>
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Mata kuliah wajib prasyarat

Mandatory prerequisites

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Pokok Bahasan

Content

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- Konsep dasar Landasan Sejarah, Prinsip Dasar, Fisika Gelombang Elektromagnetik, Wahana Pengangkut, Geometrik Satelit. Jenis dan Spesifikasi Citra, Pengertian Satelit Penginderaan Jauh Pasif, Karakter Reflektan pada Obyek di Permukaan Bumi. Interpretasi analog Penginderaan Jauh*: Pengertian Dasar, Landasan Interpretasi, Kunci Interpretasi, Macam, Cara/Metode, Proses, Alat, Data/Dokumen Interpretasi.* Interpretasi digital Penginderaan Jauh (Remote Sensing Interpretation).
- Pengertian Dasar, Landasan Interpretasi, Kunci Interpretasi, Macam, Cara/Metode, Proses, Alat, Data/Dokumen Interpretasi. Peralatan dasar Penginderaan Jauh (pengolahan citra) untuk menghitung dan menginterpretasi citra satelit. kegiatan informasi geospasial metode Penginderaan Jauh dengan membuat persyaratan pekerjaan, membuat orbit satelit.

- *Basic concepts of Historical Platform, Basic Principles, Physics of Electromagnetic Waves, Rides of Transporters, Geometric Satellites. Image Types and Specifications, Understanding Satellite Remote*

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</table>

	Sensing Passive, Reflectant Characteristics on Objects on Earth's Surface. Interpretation of analog Remote Sensing: Basic Definition, Basis of Interpretation, Key Interpretation, Kinds, Methods / Methods, Processes, Tools, Data / Document Interpretation. Remote Sensing Interpretation (Digital). • *Basic Definition, Interpretation Basis, Key Interpretation, Kinds, Methods / Methods, Processes, Tools, Data / Document Interpretation. Remote Sensing basic equipment (image processing) to calculate and interpret satellite imagery. the geospatial information activities of Remote Sensing methods by making job requirements, making satellite orbit.*
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	<table><tr><th>Rencana Evaluasi</th><th>Bobot *Weight*</th></tr><tr><td>Presentasi *Presentation*</td><td>28%</td></tr><tr><td>Studi Kasus *Case Method*</td><td>22%</td></tr><tr><td>Evaluasi Tengah Semester *Mid Semester Exam*</td><td>20%</td></tr><tr><td>Evaluasi Akhir Semester *Final Examination*</td><td>30%</td></tr></table>
Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	1. Church VA, *Manual of Remote Sensing*, American Society of Photogrametry, 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 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, Penterjemah Bambang Purbowaseso, *Penginderaan Jauh Terapan*, 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.

8. Metodologi Penelitian / *Research Methodology*

Nama modul *Module name*	**Metodologi Penelitian** *Research Methodology*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185204
Mata kuliah *Course*	Metodologi Penelitian *Research Methodology*
Semester *Semester*	II (dua) *II (two)*
Penanggung jawab mata kuliah *Person responsible for the module*	Eko Yuli Handoko
Dosen *Lecturer*	Eko Yuli Handoko 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 Program 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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Mata kuliah ini bertujuan untuk membekali para mahasiswa agar mampu mengidentifikasi, menganalisis,

Description of Course	dan mengembangkan pengetahuan dan teknologi dalam teknik geomatika. Serta mahasiswa mampu untuk mengelola penelitian untuk pengembangan yang bermanfaat dalam kerangka pemikiran logis , kritis dan sistematis yang di terapkan dalam penyusunan tesis. *This course aims to equip students with the ability to identify, analyze, and develop knowledge and technology in geomatics engineering. Students can also use critical, logical, and systematic thinking when they write their thesis to help them manage their research for useful growth.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mampu mengidentifikasi, menganalisis permasalahan dalam teknik geomatika untuk penyusunan laporan tesis berdasarkan langkah-langkah penelitian yang sesuai dengan topik ataupun permasalahan Tesis. 2. Mampu bertanggung jawab kepada masyarakat dalam menyelesaikan permasalahan teknik di bidang geodesi, surveying, hidrografi, penginderaan jauh, fotogrametri, sistem informasi geografis, dan kadaster sesuai dengan etika profesi. 3. Mampu melaksanakan penelitian dalam bidang geodesi, surveying, hidrografi, penginderaan jauh, fotogrametri, sistem informasi geografis, dan kadaster secara berkelanjutan dan berwawasan lingkungan.
Module objectives/ Course learning outcomes	*1. Able to identify and analyze problems in geomatics techniques for the preparation of a thesis report based on research steps that are in accordance with the topic or thesis problem.* *2. In order to be responsible to the public in solving technical problems in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, geographic information systems, and cadastres in accordance with professional ethics.* *3. Students can do research in the fields of geodesy, surveying, hydrography, remote sensing, photogrammetry, geographic information systems, and cadastres in a way that is both safe and good for the earth.*

CPMK dan hubungan dengan CPL Prodi
Learning outcomes and their corresponding to PLOs

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1			✓		✓	✓						
CLO.2			✓		✓	✓						
CLO.3			✓		✓	✓						

Mata kuliah wajib prasyarat
Mandatory prerequisites

-

Pokok Bahasan

- Studi pustaka, definisi masalah, tujuan dan manfaat, pengumpulan data, metodologi penelitian/penyelesaian masalah, pelaksanaan penelitian/penyelesaian masalah, analisa hasil, kesimpulan dan saran

Content

- *Library study, problem definition, objectives and benefits, data collection, research / problem solving methodology, research / problem solving, results analysis, conclusions and suggestions.*

Pembelajaran dan Persyaratan Ujian
Study and examination requirements and forms of examination

Rencana Evaluasi	**Bobot** ***Weight***
Evaluasi Tengah Semester *Mid Semester Exam*	40%
Evaluasi Akhir Semester *Final Exam*	40%
Tugas *Assessment*	10%
Kuis *Cognitive quiz*	10%

Media yang digunakan
Media employed

Classical teaching tools with whiteboard and powerpoint presentation

Daftar Pustaka
Reading list

1. Program Pasca Sarjana ITS, 2014, *Pedoman penyusunan thesis*, Pasca Sarjana ITS Surabaya.
2. Purbo-hadiwidjojo, 1993*, Menyusun Laporan Teknik,* Penerbit ITB,Bandung
3. Leedy, Paul D. and Jeanne Ellis Ormrod. 2010. *Practical Research: Planning and Design, Ninth Edition*. Pearson Education, Inc

9. Tesis / *Thesis*

Nama modul *Module name*	**Tesis** *Thesis*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185401
Mata kuliah *Course*	Tesis *Thesis*
Semester *Semester*	IV (empat) *IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Ira Mutiara Anjasmara
Dosen *Lecturer*	Ira Mutiara Anjasmara
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*	8 SKS *8 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	Mata kuliah Tesis ini merupakan mata kuliah yang harus dikerjakan oleh mahasiswa secara mandiri sebagai

Description of Course	syarat untuk menyandang gelar akademik Magister Teknik. Mata kuliah Tesis ini merupakan aplikasi dari salah satu atau lebih mata kuliah yang telah diambil oleh mahasiswa Teknik Geomatika selama 4 (empat) semester sesuai dengan bidang dan minat masing-masing. Berdasarkan Laboratorium yang ada, maka mahasiswa dapat mengambil Tugas Akhir yang sesuai dengan minatnya yaitu Geodesy & Surveying, Geospasial, Geomarin, Administrasi Pertanahan dan Geodinamika dan Lingkungan. Pada saat mengambil Tugas Akhir ini, diharapkan Mahasiswa mampu menyelesaikan/menganalisa suatu kasus atau masalah dengan ilmu dan teknologi survai dan pemetaan atau menganalisa data spasial pada suatu kasus/metode dan memberikan kesimpulan serta saran terhadap permasalahan yang dijadikan objek penelitiannya. *This thesis course is a course that must be done by the students independently as a condition to hold the academic degree of Master of Engineering. This thesis course is an application from one or more courses that have been taken by Geomatics Engineering students for 4 (four) semesters according to their respective fields and interests. Based on the existing laboratory, the students can take the final task according to their interests, namely Geodesy & Surveying, Geospatial, Geomarin, Land Administration and Geodynamics and Environment. At the time of this Final Assignment, students are expected to be able to complete / analyze a case or problem with science and technology survey and mapping or analyzing spatial data on a case / method and give conclusions and suggestions on the problems that made the object of his research.*
CPL Prodi yang dibebankan *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2												
CLO.3												
CLO.4												
CLO.5												
CLO.6												
CLO.7												
CLO.8												

Mata kuliah wajib prasyarat *Mandatory prerequisites*	Metodologi Penelitian *Research Methodology*

<table>
<tr><td>Capaian Pembelajaran / Course Learning Outcomes

Module objectives/ Course learning outcomes</td><td>1.</td></tr>
<tr><td>Pokok Bahasan

Content</td><td>• Studi pustaka, definisi masalah, tujuan dan manfaat, pengumpulan data, metodologi penelitian/penyelesaian masalah, pelaksanaan penelitian/penyelesaian masalah, analisa hasil, kesimpulan dan saran

• Library study, problem definition, objectives and benefits, data collection, research / problem solving methodology, research implementation / problem solving, results analysis, conclusions and suggestions</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></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table></td></tr>
<tr><td>Media yang digunakan
Media employed</td><td>Classical teaching tools with white board and power point presentation</td></tr>
<tr><td>Daftar Pustaka
Reading list</td><td>1. Program Pasca Sarjana ITS, 2014, Pedoman Penyusunan Tesis, Pasca Sarjana ITS Surabaya.
2. Purbo-hadiwidjojo, 1993, Menyusun Laporan Teknik, Penerbit ITB,Bandung
3. Leedy, Paul D. and Jeanne Ellis Ormrod. 2010. Practical Research: Planning and Design, Ninth Edition. Pearson Education, Inc</td></tr>
</table>

MATA KULIAH PILIHAN
(*ELECTIVE COURSES*)

1. Analisa Data Sistem Penentuan Posisi Global / *Global Navigation System Data Analysis*

Nama modul *Module name*	**Analisa Data Sistem Penentuan Posisi Global** *Global Navigation Satellite System Data Analysis*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185901
Mata kuliah *Course*	**Analisa Data Sistem Penentuan Posisi Global** *Global Navigation Satellite System Data Analysis*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Mokhamad Nur Cahyadi
Dosen *Lecturer*	Mokhamad Nur Cahyadi Eko Yuli Handoko
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*	
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2												
CLO.3												
CLO.4												
CLO.5												
CLO.6												
CLO.7												
CLO.8												

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	
Pokok Bahasan *Content*	Konsep, propagasi sinyal, pengukuran jarak dengan pseudarange-fase, sistem orbit, kesalahan, bias dan metode pengukuran Sistem Navigasi Satelit Global beserta penggunaannya dalam bidang geomatika serta mengajarkan kepada mahasiswa bagaimana cara pengolahanya baik menggunakan perangkat lunak komersial maupun ilmiah. *Concepts, signal propagation, distance measurement with phase-range, orbital systems, errors, biases and measurement methods of the Global Satellite Navigation System and their use in geomatics and teach students how to process them using both commercial and scientific software.*
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	**Bobot** ***Weight***

Media yang digunakan *Media employed*	Classical teaching tools with white board and powerpoint presentation
Daftar Pustaka *Reading list*	1. Wolf, 2010. Elementary Surveying 2. Abidin, H.Z., 2005. Geodesi Satelit 3. Abdiin, H.Z., 2005. Survei Satelit

2. Analisa Deformasi dan Geodinamika / *Deformation and Geodynamics Analysis*

Nama modul *Module name*	**Analisa Deformasi dan Geodinamika** *Deformation and Geodynamics Analysis*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185902
Mata kuliah *Course*	Analisa Deformasi dan Geodinamika *Deformation and Geodynamics Analysis*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Ira Mutiara Anjasmara
Dosen *Lecturer*	Ira Mutiara Anjasmara Eko Yuli Handoko
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 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*	Dalam kuliah ini dipelajari mengenai ilmu dan konsep dari geodinamika terkait struktur dan dinamika bumi seperti fenomena gunung api, pergerakan lempeng (landslide dan gempa). Setelah mempelajari studi geodinamika ini diharapkan dapat membuka wawasan mahasiswa mengenai pemanfaatan, pengembangan konsep dan prinsip ilmu untuk pengolahan dan analisis data sehingga dapat digunakan untuk kepentingan penelitian mandiri dan pemanfaatan dalam mitigasi bencana. *In this lecture is studied about the science and concepts of geodynamics related to the structure and dynamics of the earth such as volcanic phenomena, the movement of plates (landslide and earthquake). After studying this geodynamic study, it is expected to open the students' insight into the utilization, concept development and science principles for processing and data analysis so that it can be used for independent research and utilization in disaster mitigation.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	1. Mampu menjelaskan fenomena geodinamika Bumi yang terkait dengan struktur Bumi dan teori tektonik lempeng. 2. Mampu mengidentifikasi jenis-jenis fenomena geodinamika Bumi. 3. Mampu mengidentifikasi teknologi geodesi yang dapat digunakan untuk lelakukan pengamatan geodinamika Bumi. 4. Mampu melakukan pengamatan dan analisa geodinamika Bumi menggunakan metode geodetik. 5. Mampu menjelaskan aspek geodesi dalam studi deformasi. 6. Mampu melakukan studi dan analisis deformasi menggunakan data pengamatan geodetik. 7. Mampu menggunakan hasil analisa geodinamika dan deformasi untuk mitigasi bencana. *1. Able to explain the Earth's geodynamic phenomena related to the structure of the Earth and plate tectonic theory.* *2. Able to identify various types of the Earth's geodynamic phenomena.* *3. Able to identify geodetic technology that can be used to carry out geodynamic observations of the Earth.* *4. Able to perform observations and analyze the Earth's geodynamics using geodetic methods.* *5. Able to explain the geodetic aspects in deformation*

	studies. *6. Able to perform studies and analysis of deformation using geodetic observation data.* *7. Able to use the results of geodynamic and deformation analysis for disaster mitigation.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2							✓					
CLO.3		✓										
CLO.4	✓		✓									
CLO.5			✓									
CLO.6		✓	✓									
CLO.7							✓					

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Pada kuliah ini mata kuliah yang diberikan adalah: 1. Pengantar Geodinamika dan Deformasi: Pengantar, Gaya Endogen dan Gaya Eksogen; 2. Struktur bumi: lapisan bumi, inti bumi, dan kareteristik bumi; 3. Lempeng tektonik: teori rekayasa lempeng, pergeseran benua, dan studi geologi; 4. Fenomena geodinamika: gunung berapi, longsor, dan gempa bumi; 5. Metode dan survei geodinamika: studi geodinamika dengan SLR, VLBI, dan GPS; 6. Studi geodinamika: studi tentang pergerakan lempeng global, regional, dan mitigasi bencana. *In this lecture the subjects given are:* *1. Introduction to Geodynamics and Deformation: Introduction, Endogenous styles and exogenous styles;* *2. Earth structure: the earth's layers, the earth's core, and the earth's kareteristics;* *3. Plate tectonics: plate engineering theory, continental drift, and geological studies;* *4. Geodynamic phenomena: volcanoes, land slides, and earthquakes;* *5. Geodynamic methods and surveys: geodynamic studies with SLR, VLBI, and GPS;* *6. Geodynamic studies: study of global plate movements, regional, and disaster mitigation.*

<table>
<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
Assignment 1</td><td>0%</td></tr>
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<tr>
<td>Media yang digunakan
Media employed</td>
<td>Classical teaching tools with white board and power point presentation</td>
</tr>
<tr>
<td>Daftar Pustaka
Reading list</td>
<td>

Turcotte, D. L and G. Schubert. 2002. Geodynamics (2nd Ed). Cambridge University Press, Cambridge.
Caspary, W.F. 1998.Concepts of Network and Deformation Analysis. Monograph 11, School of Surveying, The University of New South Wales.
Smith, D. E and D.L. Turcotte. 2013. Contribution of Space Geodesy to Geodynamics. Published by the American Geophysical.
Stacey, F. D and P.M. Davis. 2008. Physics of the Earth (4th Ed). Cambridge University Press, New York.
Segall, Paul. 2010. Earthquake and Volcano Deformation. Princenton University Press. Pricenton. New Jersey.

</td>
</tr>
</table>

3. Rekayasa Survei Data Terestris / *Terrestrial Data Management*

Nama modul *Module name*	**Rekayasa Survei Data Terestris** *Terrestrial Data Management*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185903
Mata kuliah *Course*	Rekayasa Survei Data Terestris *Terrestrial Data Management*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Filsa Bioresita
Dosen *Lecturer*	Filsa Bioresita
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Pada kuliah ini akan diberikan dasar-dasar matematika yang mencakup tentang geometri dan trigonometri

Description of Course	bidang geomatika untuk aplikasi bidang teknik sipil (bangunan gedung dan infrastruktur, geometri jalan raya, perencanaan elevasi dan posisi planimetris, galian dan timbunan). Peran geomatika dalam teknik dan metode untuk mendukung aplikasi bidang teknik sipil. *This course will provide the basics of mathematics which includes geometry and trigonometry in the field of geomatics for applications in the field of civil engineering (buildings and infrastructure, road geometry, planimetric elevation, and position planning, excavation, and embankment). The role of geomatics in engineering and methods to support applications in the civil engineering field.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	1. Mampu menjelaskan konsep dasar-dasar kalkulus untuk rekayasa survei data terestris. 2. Mampu menjelaskan geometri jalan raya secara umum. 3. Mampu menjelaskan konsep dasar dan staking out alinemen horisontal dan vertikal. 4. Mampu memahami tentang uit zet untuk bangunan. 5. Mampu menjelaskan tentang perhitungan volume tanah (galian dan timbunan). *1. Able to explain the basic concepts of calculus for terrestrial data survey engineering.* *2. Able to explain road geometry in general.* *3. Able to explain basic concepts and stake out horizontal and vertical alignment.* *4. Able to understand about uit zet for buildings.* *5. Able to explain the calculation of soil volume (excavation and embankment).*
CPL Prodi yang dibebankan *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1			✓									
CLO.2				✓								
CLO.3				✓								
CLO.4				✓								
CLO.5			✓	✓			✓					

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Tuliskan seluruh mater

<table>
<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 Kelompok
Team based task</td><td>20%</td></tr>
<tr><td>Evaluasi Tengah Semester
Midterm Exam</td><td>30%</td></tr>
<tr><td>Tugas Studi Kasus
Case based task</td><td>20%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Examination</td><td>30%</td></tr>
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</td></tr>
<tr><td>Media yang digunakan
Media employed</td><td>Classical teaching tools with white board and power point presentation</td></tr>
<tr><td>Daftar Pustaka
Reading list</td><td>Tuliskan seluruh pustaka</td></tr>
</table>

4. Aplikasi Geologi dan Geofisika / *Applied of Geology and Geophysics*

Nama modul *Module name*	**Aplikasi Geologi dan Geofisika** *Applied of Geology and Geophysics*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185904
Mata kuliah *Course*	Aplikasi Geologi dan Geofisika *Applied of Geology and Geophysics*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Ayi Syaeful Bahri
Dosen *Lecturer*	Ayi Saeful Bahri Amien Widodo
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 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*	

CPL Prodi yang dibebankan *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2												
CLO.3												
CLO.4												
CLO.5												
CLO.6												
CLO.7												
CLO.8												

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	
Pokok Bahasan *Content*	Tuliskan seluruh mater
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	Bobot *Weight*

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	Tuliskan seluruh pustaka

5. Pemodelan Gayaberat Bumi / *Earth Gravity Modelling*

Nama modul *Module name*	**Pemodelan Gayaberat Bumi** *Earth Gravity Modelling*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185905
Mata kuliah *Course*	Pemodelan Gayaberat Bumi *Earth Gravity Modelling*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Ira Mutiara Anjasmara
Dosen *Lecturer*	Ira Mutiara Anjasmara
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Matakuliah ini mempelajari pemodelan bentuk dan ukuran Bumi (Geoid) menggunakan data gayaberat

Description of Course	dengan berbagai metode. *This course studies the modeling of the shape and size of the Earth (Geoid) using gravity data with various methods.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	1. Mampu menjelaskan konsep dasar berbagai metode pemodelan geoid. 2. Mampu membuat model geoid gravimetrik menggunakan berbagai metode dari data gayaberat yang didapatkan dari pengukuran. 3. Mampu melakukan analisis dan validasi terhadap model geoid yang dihasilkan. *1. Able to explain the basic concepts of various geoid modeling methods.* *2. Able to create gravimetric geoid models using various methods from gravity data obtained from measurements.* *3. Able to perform analysis and validation of the resulting geoid model.*
CPL Prodi yang dibebankan *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1			✓									
CLO.2				✓								
CLO.3								✓				

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	1. Teori dasar gayaberat Bumi 2. Pengukuran dan reduksi anomali gayaberat Bumi 3. Model Gayaberat Bumi Global 4. Solusi Integral Stokes - Direct Numerical Integration - FFT - LSC 5. Pemodelan Geoid Gravimetrik 6. Pemodelan Geoid menggunakan Gravsoft *1. The basic theory of Earth's gravity* *2. Measurement and reduction of the Earth's gravity anomaly* *3. Global Earth Gravity Model* *4. Stokes Integral Solution*

	5. Gravimetric Geoid Modelling *- Direct Numerical Intregation* *- FFT* *- LSC* *6. Geoid Modeling using Gravsoft*
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	<table><tr><th>Rencana Evaluasi</th><th>Bobot *Weight*</th></tr><tr><td>Tugas 1: Data gayaberat *Assign 1: Gravity Data*</td><td>10%</td></tr><tr><td>Tugas 2: Studi Literatur (Geoid Model) *Assign 2: Literature study (Geoid Model)*</td><td>10%</td></tr><tr><td>Presentasi 1 *Presentation 1*</td><td>10%</td></tr><tr><td>Tugas 3: Geoid Gravimetrik sederhana *Assign 3: Simple Gravimetric Geoid*</td><td>20%</td></tr><tr><td>Tugas 4: Pemodelan Geoid *Assign 4: Geoid Modelling*</td><td>35%</td></tr><tr><td>Presentasi 2 *Presentation 2*</td><td>15%</td></tr></table>
Media yang digunakan *Media employed*	Classical teaching tools with whiteboard and powerpoint presentation
Daftar Pustaka *Reading list*	1. Hofmann-Wellenhof, B. and H. Moritz. 2005. *Physical Geodesy*. Vienna: Springer. 2. Bomford, G. 1980. *Geodesy*, Oxford University Press, Oxford 3. Torge, W. 2001. *Geodesy*. de Gruyter, Berlin. 4. Vaníček, P. and E.J. Krakiwsky.1986. *Geodesy: the Concepts*. 2nd ed. Amsterdam: Elsevier 5. Torge, W. 1989. *Gravimetry*. de Gruyter, Berlin. 6. Blakely, R.J. 1994. *Potential Theory in Gravity and Magnetic Applications*, Cambridge University Press, Cambridge. 7. Chuji Tsuboi. 1979. *Gravity*, Allen & Unwin, London.

6. Pengelolaan Infrastruktur Informasi Geospasial / *Management of Geospatial Information Structure*

Nama modul *Module name*	**Pengelolaan Infrastruktur Informasi Geospasial** *Management of Geospatial Information Infrastructure*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185906
Mata kuliah *Course*	Pengelolaan Infrastruktur Informasi Geospasial *Management of Geospatial Information Infrastructure*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Bangun Muljo Sukojo
Dosen *Lecturer*	Bangun Muljo Sukojo
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 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*	Mata kuliah ini berisikan materi tentang konsep dasar Pengelolaan Infrastruktur Informasi Geospasial (IIG). Peran teknik geomatika dalam mendesain, membangun, mengelola dan mengembangkan IIG. Dalam peran IIG di Indonesia, terkait berbagi-pakai serta tukar guna data dan informasi geospasial dalam rangka menanggapi permasalahan dan isu terkait IIG. *This course contains material on the basic concepts of Geospatial Information Infrastructure Management (IIG). The role of geomatics engineering in designing, building, managing, and developing IIG. In the role of IIG in Indonesia, related to sharing and exchanging for geospatial data and information in order to respond to problems and issues related to IIG.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	1. Mampu menjelaskan konsep dan komponen penyusun Infrastruktur Informasi Geospasial (IIG). 2. Mampu menjelaskan kebutuhan data dan informasi geospasial dalam Infrastruktur Informasi Geospasial (IIG). 3. Mampu menjelaskan konsep metadata, interoperabilitas dan katalog fitur. 4. Mampu membuat desain geoportal. 5. Mampu menjelaskan konsep dan metode evaluasi Infrastruktur Informasi Geospasial (IIG) dan geoportal. 6. Mampu menjelaskan isu pemanfaatan sumberdaya alam versus pelestarian lingkungan. *1. Able to explain the concepts and constituent components of Geospatial Information Infrastructure (IIG).* *2. Able to explain the needs of geospatial data and information in the Geospatial Information Infrastructure (IIG).* *3. Able to explain the concept of metadata, interoperability, and catalog features.* *4. Able to create geoportal design.* *5. Able to explain the concepts and methods of evaluation of Geospatial Information Infrastructure (IIG) and geoportal.* *6. Able to explain the issue of natural resource utilization versus environmental conservation.*

CPL Prodi yang dibebankan *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓	✓										
CLO.2			✓				✓					
CLO.3				✓			✓					
CLO.4				✓			✓					
CLO.5			✓	✓			✓					
CLO.6			✓	✓			✓					

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Tuliskan seluruh mater
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	Bobot *Weight*
Tugas Presentasi *Assignment Presentation*	16%
Studi Kasus *Case Method*	18%
Hasil Proyek *Team Based Project*	16%
Evaluasi Tengah Semester *Middle Term Examination*	22%
Evaluasi Akhir Semester *Final Examination*	28%

Media yang digunakan *Media employed*	Classical teaching tools with whiteboard and powerpoint presentation
Daftar Pustaka *Reading list*	Tuliskan seluruh pustaka

7. Perencanaan Wilayah / *Urban and Regional Planning*

Nama modul *Module name*	**Perencanaan Wilayah** *Urban and Regional Planning*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185907
Mata kuliah *Course*	Perencanaan Wilayah *Urban and Regional Planning*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Teguh Hariyanto
Dosen *Lecturer*	Teguh Hariyanto
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Pada mata kuliah ini mahasiswa akan mempelajari tentang teori dasar dan komponen perencanaan

Description of Course	wilayah untuk pemanfaatannya lebih lanjut. Metode pengumpulan menggunakan berbagai tipe data dari area perencanaan skala yang berbeda dibahas dalam kuliah dan tugas. Dengan demikian, mahasiswa mampu memiliki pengalaman mengumpulkan dan membuat berbagai tipe data untuk perencanaan wilayah. Mata kuliah ini juga berkaitan dengan perencanaan daerah di era otonomi yang terdiri dari tahapan perencanaan daerah, perencanaan sumber daya, tata cara perencanaan di era otonomi dan berbagai pemecahan masalah bagi pelaksanaan perencanaan pembangunan daerah. Selain itu, pemanfaatan data spasial dan nonspasial akan disajikan sebagai studi kasus. Sehingga mahasiswa dapat lebih memahami jenis-jenis topologi dalam perencanaan wilayah dengan mengembangkan Analisa data menggunakan teknologi SIG. Pada akhirnya, mahasiswa mampu memiliki pengalaman berpikir kritis dalam pemanfaatan dan pengembangan teknologi informasi di berbagai bidang yang berkaitan dengan perencanaan wilayah dan pembangunan infrastruktur. *In this course, students will study about the basic theory and components of regional planning for its further utilization. The methods for collecting various data types from different scale planning area are discussed in lecture and assignments. Thereby, students are able to possess experiences of collecting and creating various data types for regional planning. The course also concerning with regional planning in the era of autonomy which consists of the stages of regional development planning, resources planning, planning procedures in the era of autonomy and various problems solving for the implementation of regional development planning. Moreover, spatial and nonspatial data utilization will be presented as a case study. Such that, students able to further understand the topology types in regional planning by developing data analysis using GIS technology. Eventually, students are able to possess experiences of thinking critically in term of the utilization and development of information technology in several fields related to regional planning and infrastructure development.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mahasiswa dapat memahami dan mengerti tentang konsep dan aturan perencanaan wilayah, komponen dan penerapannya.

Module objectives/ Course learning outcomes	2. Mahasiswa mengetahui serta memahami proses dan parameter dalam penyusunan perencanaan wilayah detail, semi detail dan global. 3. Mahasiswa mengerti manfaat dari metoda dalam perencanaan wilayah serta bidang lain yang terkait. 4. Mahasiswa memahami dan mampu dalam mengaplikasikan metoda SIG untuk perencanaan wilayah dalam rangka menganalisis hasil wilayah permukiman, industri dan kawasan lindung. *1. Students can understand and understand the concepts and rules of Regional planning, components, and their application.* *2. Students know and understand the processes and parameters in the preparation of detailed, semi-detailed, and global regional planning.* *3. Students understand the benefits of methods in regional planning and other related fields.* *4. Students understand and are able to apply GIS methods for regional planning in order to analyze the results of residential, industrial and protected areas.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓										
CLO.2			✓									
CLO.3				✓								
CLO.4						✓						

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Pengertian, komponen dan jenis data perencanaan daerah, perencanaan daerah dalam era otonomi, pokok-pokok perencanaan pembangunan daerah, tahapan perencanaan pembangunan, sumber daya perencanaan daerah, tata cara pelaksanaan perencanaan dan pemecahan masalah, strategi pembangunan fundamental ekonomi daerah, ciri dan proses dari penyusunan rencana yang komprehensif. *Definition, component and regional planning data types, regional planning in the era of autonomy, the principal of regional development planning, development planning stages, regional planning resources, the implementation of planning procedures and solving problems, regional economic fundamentals development strategy, characteristics and process of the*

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Study and examination requirements and forms of examination</td><td>
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<tr><td>Evaluasi Tengah Semester
Middle Term Examination</td><td>20%</td></tr>
<tr><td>Studi Kasus
Case Method</td><td>30%</td></tr>
<tr><td>Kuis
Cognitive Quiz</td><td>20%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Examination</td><td>30%</td></tr>
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<tr><td>Media yang digunakan
Media employed</td><td>Classical teaching tools with white board and powerpoint presentation</td></tr>
<tr><td>Daftar Pustaka
Reading list</td><td>1. Achmad D,2012 ,Proses Perencanaan Wilayah dan Kota, Gadjah Mada Univesiti Press, Yogjakar
2. Burrough, P.A, 1996. “Principles of Geographical Information System For Land Resources Assessment”. Oxford University Press Inc, New York
3. Mudrajad,K,2004,Otonomi dan Pembangunan Daerah, Penerbit Erlangga, Jakarta.
4. Siti.S.N, 2002, Perencanaan Wilayah di Indonesia pada masa sekitar krisis,Penerbit ITB,Bandung.</td></tr>
</table>

8. Fotografi Modern / *Modern Photogrammetry*

Nama modul *Module name*	**Fotogrametri Modern** *Modern Photogrammetry*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185908
Mata kuliah *Course*	Fotogrametri Modern *Modern Photogrammetry*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Teguh Hariyanto
Dosen *Lecturer*	Teguh Hariyanto
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Mata kuliah ini membahas tentang konsep dan metode pemetaan dengan Teknik fotogrametri. Topik dimulai

Description of Course	dengan konsep dan sejarah fotogrametri yang meliputi latar belakang teori, metode akuisisi data, dan pengolahan data. Metode pengolahan data dalam fotogrametri saat ini telah berkembang kearah fotogrametri digital yang meliputi kalibrasi kamera, orientasi relative, orientasi absolut dan penyesuaian bundel. Metode terbaru lainnya dalam fotogrametri juga dibahas dalam mata kuliah ini, terutama terkait dengan bidang lain seperti pencocokan citra digital, struktur dari pergerakan, dan klasifikasi citra digital. Mata kuliah ini juga membahas tentang penerapan Teknik fotogrametri untuk berbagai kebutuhan dalam masalah lingkungan, pemukiman manusia, serta pemodelan 3D. Mata kuliah ini diajarkan di ruang kelas dan laboratorium yang memungkinkan mahasiswa memiliki banyak pengalaman dalam penerapan fotogrametri. *This course discusses about the concept and method of mapping with photogrammetric techniques. The topics start with the concept and history of photogrammetry which includes theoretical background, data acquisition method, and data processing. The data processing methods in photogrammetry nowadays have been developed towards digital photogrammetry which includes camera calibration, relative orientation, absolute orientation and bundle adjustment. Other recent methods in photogrammetry are also discussed in this course, especially related to other fields such as digital image matching, structure from motion, and digital image classification. This course also discuss about application of photogrammetric techniques for various needs in environment problem, human settlements, and also 3D modeling. The course is conducted in classroom and laboratory which allows students having much experiences in the application of photogrammetry.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2		✓										
CLO.3			✓									
CLO.4				✓								
CLO.5					✓							

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-

Capaian Pembelajaran / *Course Learning Outcomes*	1. Mahasiswa mampu menjelaskan konsep fisika elektro optikal digital (CCD/CMOS), kamera metrik dan non metrik digital dan peralatan lainnya beserta model matematis untuk kalibrasi dan koreksinya. 2. Mahasiswa mampu menjelaskan model konsep digital secara teoritis dan empiris dalam perhitungan fotogrametri tiga dimensi dengan data photo udara digital mono dan stereo. 3. Mahasiswa mampu menerapkan konsep fotogrametri digital workstation dalam penyelesaian proses orientasi digital dalam bentuk model matematis 3D antara koordinat photo dan koordinat obyek (tanah) untuk mendapatkan detail planimetris dan tinggi. 4. Mahasiswa mampu mengetahui dan menerapkan penenalan obyek secara digital dalam rangka interpretasi obyek berbasis area, dan pixel. 5. Mahasiswa mampu mengetahui dan menerapkan konsep Teknologi LIDAR untuk mendapatkan DEM, DSM dan kontur.
Module objectives/ Course learning outcomes	*1. Students are able to explain the concepts of digital electro-optical physics (CCD/CMOS), digital metric and non-metric cameras and other equipment along with mathematical models for calibration and correction.* *2. Students are able to explain theoretically and empirically digital concept models in three-dimensional photogrammetry calculations with mono and stereo digital aerial photo data.* *3. Students are able to apply the concept of digital photogrammetry workstation in completing the digital orientation process in the form of a 3D mathematical model between photo coordinates and object coordinates (ground) to obtain planimetric and height details.* *4. Students are able to know and apply object recognition digitally in the context of area and pixel-based object interpretation.* *5. Students are able to know and apply the concept of LIDAR Technology to obtain DEM, DSM and contours.*
Pokok Bahasan	1. Metode fotogrametri: definisi, sejarah, optik, pengukuran dan interpretasi.

<table>
<tr>
<td>Content</td>
<td>2. Proses fotogrametri: perhitungan dasar dalam citra vertikal dan miring, sistem koordinat, transformasi koordinat, kalibrasi kamera
3. Fotogrametri digital: citra digital, persamaan kolinearitas, orientasi interior dan eksterior
4. Teknik fotogrametri terkini: kamera format kecil, fotogrametri jarak dekat, Structure from Motion (SFM)

1. Method of photogrammetry: definition, history, optics, measurement and interpretation.
2. Photogrammetric process: basic computations in vertical and oblique imagery, coordinate systems, coordinate transformation, camera calibration
3. Digital photogrammetry: digital imagery, collinearity equation, interior and exterior orientation
4. Recent photogrammetrc techniques: small format camera, close range photogrammetry, Structure from Motion (SFM)</td>
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<td>Pembelajaran dan Persyaratan Ujian
Study and examination requirements and forms of examination</td>
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Weight</th></tr>
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Middle Term Examination</td><td>10%</td></tr>
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Final Examination</td><td>20%</td></tr>
<tr><td>Hasil Proyek 1
Team base project 1</td><td>30%</td></tr>
<tr><td>Hasil Proyek 1
Team base project 1</td><td>20%</td></tr>
<tr><td>Studi Kasus
Case Method</td><td>20%</td></tr>
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Media employed</td>
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<td>Daftar Pustaka
Reading list</td>
<td>Principal :
1. Mikhail, Bethel, McGlone. 2005. Introduction to Modern Photogrammetry, John Willey & Sons.
2. Wolf, PR & Dewitt,BA. Elements of Photogrammetry with Appl. in GIS, 2004, McGraw-Hill.
3. Kraus K., Photogrammetry, Vol 1 and 2. 4th rev. ed, Ferd. Dümmlers Verlag, 1993

Supplementary :
1. Sandau, R. 2010. Digital Airborne Camera Introduction and Technology, Springer.</td>
</tr>
</table>

	2. Teguh Hariyanto. 2006. *Modul Ajar Fotogrametri*, Teknik Geodesi – FTSP, ITS

9. Konversi Data Spasial / *Spatial Data Conversion*

Nama modul *Module name*	**Konversi Data Spasial** *Spatial Data Conversion*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185909
Mata kuliah *Course*	Konversi Data Spasial *Spatial Data Conversion*
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*	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 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 mempelajari konsep-konsep umum: konsep dasar data spasial, transformasi data spasial, sistem koordinat, sistem proyeksi, dan pemecahan masalah konversi data spasial. Pemahaman konsep dasar meliputi pengertian referensi ellipsoid, ellipsoid geometrik, dan sistem koordinat. Mempelajari proyeksi peta yang mencakup berbagai transformasi koordinat, dan proyeksi. Memahami faktor skala peta, transformasi sudut pada proyeksi konformasi, serta konvergensi meridian. Memahami Konversi Data Spasial, Hubungan Konversi Data Spasial dengan disiplin ilmu lain, Konversi Data Spasial dalam kaitannya dengan Sistem Informasi Geografis, Konversi Data Spasial Tingkat Lanjut di tingkat nasional dan internasional, serta peran dan fungsi Konversi Data Spasial dalam Sistem Informasi Manajemen (SIM). Siswa juga akan melaporkan hasil percobaan dan analisis baik secara tertulis maupun lisan. Mahasiswa juga diharapkan mampu bekerja secara mandiri maupun dalam tim. *In this course, students learn about general concepts: basic concepts of spatial data, spatial data transformation, coordinate system, projection system, and spatial data conversion problem-solving. Understanding of basic concepts including the definition of ellipsoid reference, geometric ellipsoid, and coordinate system. Learning about map projection that includes various coordinate transformations, and projections. Understanding the map scale factor, angular transformation on conformational projection, as well as meridian convergence. Understanding Spatial Data Conversion, Spatial Data Conversion relation with other disciplines, Spatial Data Conversion in relation with Geographic Information System, Advance Spatial Data Conversion at a national and international level, and also role and function of Spatial Data Conversion in Management Information System (SIM). Students will also report the result of the experiments and analysis both in writing and orally. Students are also expected to be able to work independently and in teams.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mempelajari konsep umum: konsep dasar data spasial, transformasi data spasial, sistem koordinat, sistem proyeksi, pemecahan masalah konversi data spasial. Pemahaman konsep dasar yang meliputi pengertian ellipsoid referensi, ellipsoid geometri, dan

	sistem koordinat. 2. Definisi Konversi Data Spasial, Konversi Data Spasial terkait dengan disiplin ilmu lainnya, Konversi Data Spasial terkait Sistem Informasi Geografis, Konversi Data Spasial Tingkat Lanjut di tingkat nasional dan internasional, peran dan fungsi Konversi Data Spasial dalam Sistem Informasi Manajeme (SIM). 3. Praktek Konversi Data Spasial, Konversi Data Spasial terkait dengan disiplin ilmu lainnya, Konversi Data Spasial terkait Sistem Informasi Geografis, Konversi Data Spasial Tingkat Lanjut di tingkat nasional dan internasional, peran dan fungsi Konversi Data Spasial dalam Sistem Informasi Manajeme (SIM). 4. Melaporkan hasil eksperimen dan analitis secara tertulis dan lisan, serta mampu bekerja secara mandiri maupun dalam tim.
Module objectives/ Course learning outcomes	*1. To learn about general concepts: basic concepts of spatial data, spatial data transformation, coordinate system, projection system, spatial data conversion problem-solving. Understanding of basic concepts that include the definition of the reference ellipsoid, geometric ellipsoid, and coordinate system.* *2. The definition of Spatial Data Conversion, Spatial Data Conversion related to other disciplinary, Spatial Data Conversion related to Geographic Information System, Advance Spatial Data Conversion at the national and international level, role and function of Spatial Data Conversion in Information System Management (ISM).* *3. Practicing of Spatial Data Conversion, Spatial Data Conversion related to other disciplinary, Spatial Data Conversion related to Geographic Information System, Advance Spatial Data Conversion at the national and international level, role and function of Spatial Data Conversion in Information System Management (ISM).* *4. To report experimental results and analytical in writing and orally, and able to work independently and in teams.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓										
CLO.2		✓					✓					
CLO.3		✓					✓					
CLO.4							✓		✓			

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan

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<td>Pembelajaran dan Persyaratan Ujian
Study and examination requirements and forms of examination</td>
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Weight</th></tr>
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Cognitive Quiz</td><td>25%</td></tr>
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Final Project</td><td>40%</td></tr>
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<td>Daftar Pustaka
Reading list</td>
<td>1. Jonathan Williams, Geographic Information From Space, Processing and Applications of Geocoded Satellite Images, Wiley-Praxis Series in Remote Sensing, Chichester, 1995.
2. Lillesand-Kiefer, Remote Sensing and Image Interpretation, John Wiley & Sons, 1979
3. Shrestha, D.P., Remote Sensing Techniques And Digital Image Processing, International Institute for Aerospace Survey and Earth Sciences, 1994</td>
</tr>
</table>

10. Sosio Ekonomi Spasial / *Socio Economic Spatial*

Nama modul *Module name*	**Sosio Ekonomi Spasial** *Socio Economic Spatial*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185910
Mata kuliah *Course*	Sosio Ekonomi Spasial *Socio Economic Spatial*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Bangun Mujo Sukojo
Dosen *Lecturer*	Bangun Mujo Sukojo
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Konsep dasar Sosio-ekonomi Spasial yang merupakan disiplin ilmu yang membahas kejadian/ fenomena

Description of Course	lingkungan hidup yang dipengaruhi oleh proses alam, bagaimana masyarakat menghasilkan organisasi dan memanfaatkan lingkungan hidup, dan bagaimana kondisi masyarakat itu sendiri yang dipengaruhi oleh lingkungan tempat dimana masyarakat tersebut berada Kontribusi ilmu Sosio-ekonomi Spasial adalah fokus pada ruang dan lingkungan sebagai prinsip dasar yg dipelajarinya. Sosio-ekonomi Spasial menyatakan harus peduli terhadap objek utama menyangkut muka bumi ketimbang ruang abstrak; fokus terhadap aspek keruangan suatu kehidupan dan lingkungan serta hubungan timbal baliknya. sensitif terhadap sumberdaya, variasi serta distribusinya di muka bumi. *The basic concept of Spatial Socio-economics which is a discipline that discusses environmental events / phenomena that are influenced by natural processes, how society produces organization and utilizes the environment, and how the condition of society itself is influenced by the environment in which the community is located. The contribution of Spatial Socio-economics is a focus on space and the environment as the basic principles it learns. Spatial socio-economics states that it should care about the main object concerning the face of the earth rather than abstract space; focus on the spatial aspects of a life and environment and its mutual relationships. sensitive to resources, variations and distribution on the face of the earth.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mampu memahami Pengertian, Sejarah dan Perkembangan Informasi Geospasial terkait dengan Social dan Ekonomi. 2. Mampu memahami pengertian Komponen Informasi Geospasial terkait dengan Social dan Ekonomi. 3. Mampu memahami pengertian Geospasial, Ruang Lingkup Informasi Geospasial terkait dengan Social dan Ekonomi. 4. Mampu memahami Pemanfaatan Informasi Geospasial di Berbagai Bidang.
Module objectives/ Course learning outcomes	*1. Able to understand the Understanding, History, and Development of Geospatial Information related to Social and Economic.* *2. Able to understand the understanding of Geospatial Information Components related to Social and Economic.* *3. Able to understand the definition of Geospatial, the scope of Geospatial Information related to Social.*

	4. *Able to understand the Utilization of Geospatial Information in Various Fields.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓	✓									
CLO.2		✓	✓									
CLO.3					✓			✓				
CLO.4					✓			✓				

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan	1. Konsep dasar sosial ekonomi Tata ruang yang merupakan disiplin ilmu yang membahas tentang kejadian/fenomena lingkungan yang dipengaruhi oleh proses alam, bagaimana masyarakat menghasilkan organisasi dan memanfaatkan lingkungan, dan bagaimana kondisi masyarakat itu sendiri yang dipengaruhi oleh lingkungan dimana masyarakat itu berada 2. Kontribusi sosial ekonomi Tata ruang adalah fokus pada ruang dan lingkungan sebagai prinsip dasar yang dipelajari. 3. Sosio-ekonomi Negara-negara spasial harus memperhatikan objek utama yang menyangkut muka bumi daripada ruang abstrak; fokus pada aspek spasial kehidupan dan lingkungan dan hubungan timbal balik mereka. peka terhadap sumber daya, variasi dan distribusi di bumi.
Content	1. *The basic concept of socio-economic Spatial which is a discipline that discusses the events / phenomena of the environment that is influenced by natural processes, how society produces the organization and utilize the environment, and how the condition of society itself that is influenced by the environment where the society is located* 2. *The contribution of socio-economic Spatial is the focus on space and environment as the basic principles learned.* 3. *Socio-economic Spatial states must care about the main object concerning the face of the earth rather than abstract space; focus on the spatial aspects of life and the environment and their reciprocal relationships. sensitive to resources, variations and distribution on earth.*

<table>
<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 Presentasi
Presentation Assignment</td><td>30%</td></tr>
<tr><td>Studi Kasus
Case Method</td><td>20%</td></tr>
<tr><td>Evaluasi Tengah Semester
Mid Semester Exam</td><td>20%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Exam</td><td>30%</td></tr>
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</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>

Jensen, J.R, 1996, Introductory Digital Image Processing : a Remote Sensing Pervective, Prentice Hall Series in Geographic Information Sciense, Second Edition.
Lillesand Kiefer, 1993, edisi Indonesia, Penginderaan Jauh dan Interpretasi Citra, John Willey and Sons/Gajah Mada University Press, Jogjakarta.
Olsen, B.P. et al, 2003, Digital Change Detection For Map Database Update.

SUPPORTING REFERENCES

Suharno, 2003, Peningkatan Kualitas Data dan Sistem Informasi Pajak Bumi dan Bangunan dalam Rangka Pelayanan Kepada Wajib Pajak, Materi Penyegaran Visi dan Misi Dit PBB (Jakarta, 20-12-2003) Direktorat Jenderal Pajak, Jakarta
Suharno, 2003, Potret Perjalanan Pajak Bumi dan Bangunan, Direktorat Jenderal Pajak, Jakarta.
Sunaryanto, 2003, Pemanfaatan Citra Ikonos untuk Revisi Peta Blok PBB, Thesis, UGM, Yogyakarta.
Wolf, Paul R, 1993, edisi indonesia, Elemen Fotogrametri dengan Interpretasi Foto Udara dan Penginderaan Jauh, edisi kedua, Gajah Mada University Press, Yogyakarta.
Rais, Jacub, dkk. Toponimi Indonesia-SejarahBudayaBangsa yang PanjangdariPermukimanManusia&TertibAdministrasi. 2008. PradnyaParamita. Jakarta.

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</table>

11. 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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Pada mata kuliah ini mahasiswa akan mempelajari tentang teori dasar satelit yang terdiri dari sejarah

Description of Course	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 analog dan digital dan selanjutnya melakukan interpretasi tersebut sesuai dengan pemahamannya. 4. Mampu memahami pengolahan citra untuk menghitung dan menginterpretasikan citra satelit.

Module objectives/ Course learning outcomes	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.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1									✓			
CLO.2		✓										
CLO.3		✓		✓								
CLO.4		✓		✓					✓			
CLO.5									✓			

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan	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 penginderaan jauh dengan membuat job requirements dan membuat orbit satelit.

Content	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.*
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	<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>
Media yang digunakan *Media employed*	Classical teaching tools with white board and powerpoint presentation
Daftar Pustaka *Reading list*	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 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.

12. Kadaster Laut Lanjut / *Advanced Marine Cadastre*

Nama modul *Module name*	**Kadaster Laut Lanjut** *Advanced Marine Cadastre*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185912
Mata kuliah *Course*	Kadaster Laut Lanjut *Advanced Marine Cadastre*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Danar Guruh Pratomo
Dosen *Lecturer*	Danar Guruh Pratomo
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Pada mata kuliah ini mahasiswa akan mempelajari tentang kadaster kelautan dan aplikasinya. Pengertian,

Description of Course	ruang lingkup dan metode pengumpulan data serta berbagai jenisnya dibahas di kelas dan dalam tugas kelompok, untuk memberikan pengalaman kepada mahasiswa dalam mengumpulkan dan memperoleh jenis data yang digunakan dalam kadaster pesisir dan kelautan. Selain itu, jenis data dan metode pemilihannya berdasarkan pengelolaan lahan di wilayah laut juga dibahas. Selain itu, studi kasus penggunaan data lapangan untuk membentuk basis data spasial dan nonspasial wilayah laut untuk penggunaan lahan dan proses pendaftaran/ persil juga sedang dipelajari. *In this course, students will learn about the marine cadastre and its application. The definitions, scope and methods of data collection and its various types are discussed in the classroom and in group tasks, in order to give students experiences in collecting and obtaining types of data utilized in coastal and a marine cadastre. In addition, types of data and their selection methods based on land management in the sea area are also being discussed. Moreover, case studies on the use of field data to form spatial and nonspatial database of marine areas for land use and registration process / land plots are also being studied.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2												
CLO.3												
CLO.4												
CLO.5												
CLO.6												
CLO.7												
CLO.8												

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	
Pokok Bahasan	Definisi Kadaster Laut; Metode delineasi batas laut, Pengembangan metode pemetaan kadaster laut, pasang surut air laut, jenis data yang digunakan dalam

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13. Sistem Informasi Manajemen / *Management Information System*

Nama modul *Module name*	**Sistem Informasi Manajemen** *Management Information System*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185913
Mata kuliah *Course*	Sistem Informasi Manajemen *Management Information System*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Teguh Hariyanto
Dosen *Lecturer*	Teguh Hariyanto Muhammad Taufik
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 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*	

Capaian Pembelajaran / *Course Learning Outcomes*	1. Mahasiswa dapat memahami dan mengerti tentang konsep SIM, komponen dan penerapannya. 2. Mahasiswa mengetahui serta memahami proses dalam penyusunan SBD di SIM. 3. Mahasiswa mengerti manfaat dari metoda SIM serta bidang lain yangg terkait. 4. Mahasiswa memahami dan mampu dalam mengaplikasikan metoda SIM beserta pengembangannya dalam perencanaan desiminasi informasi geospasial dan jaringannya.
Module objectives/ Course learning outcomes	*1. Students can understand and understand the concept of MIS, its components and applications.* *2. Students know and understand the process in the preparation of DBMS in SIM.* 3. *Students understand the benefits of the SIM method and other related fields.* 4. *Students understand and are able to apply the SIM method and its development in planning the dissemination of geospatial information and its network.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓										
CLO.2			✓									
CLO.3				✓								
CLO.4						✓						

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Tuliskan seluruh mater
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	**Bobot** ***Weight***
Evaluasi Tengah Semester *Middle Term Examination*	20%
Studi Kasus *Case Method*	30%
Kuis *Cognitive Quiz*	20%
Hasil Proyek *Team Based Project*	30%

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation

Daftar Pustaka *Reading list*	Tuliskan seluruh pustaka

14. Rekayasa Survei Hidrografi / *Applied Hydrographic Survey*

Nama modul *Module name*	**Rekayasa Survei Hidrografi** *Applied Hydrographic Survey*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185914
Mata kuliah *Course*	Rekayasa Survei Hidrografi *Applied Hydrographic Survey*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Danar Guruh Pratomo
Dosen *Lecturer*	Danar Guruh Pratomo
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: 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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Mata kuliah Rekayasa Survei Hidrografi berfokus pada pemahaman konsep hidrografi secara terperinci meliputi aspek teknis instrumen akustik (echosounder), propagasi gelombang suara di kolom air, hingga aplikasi

	survei hidrografi. Selain itu, faktor-faktor lainnya yang berkaitan dengan survei hidrografi juga dibahas pada mata kuliah ini seperti pasang surut air laut dan *Underwater Acoustic Positioning*. Secara keseluruhan, mata kuliah ini akan memberikan pemahaman kepada mahasiswa terkait cara kerja instrumen akustik beserta faktor-faktor yang mempengaruhinya. Mata kuliah ini dirancang bagi mahasiswa magister yang fokus pada bidang geomatika kelautan dengan keterkaitannya pada mata kuliah lain seperti oseanografi fisik lanjut. Selain itu, mata kuliah ini juga bersinggungan dengan kelompok keilmuan kadaster melalui Kadaster Laut Lanjut dan Aspek Geodetik dalam Penentuan Hukum Laut. Pengalaman praktis pada mata kuliah ini akan memberikan kesempatan kepada mahasiswa untuk memahami lebih dalam mengenai survei hidrografi dan mampu mengaplikasikannya pada variasi tujuan survei hidrografi di masa depan.
Description of Course	*The Applied Hydrographic Survey course focuses on understanding hydrographic concepts in detail including technical aspects of acoustic instruments (echosounder), sound wave propagation in the water column, and hydrographic survey applications. In addition, other factors related to hydrographic surveys are also discussed in this course such as tides and Underwater Acoustic Positioning. Overall, this course will provide students with an understanding of how acoustic instruments work and the factors that influence it. This course is designed for master students who focus on the field of marine geomatics with its links to other subjects such as advanced physical oceanography. In addition, this course also intersects with cadastral scientific groups through Advanced Marine Cadastre and Geodetic Aspects in Determining the Law of the Sea. Practical experience in this course will give students the opportunity to understand more deeply about hydrographic surveying and be able to apply it to various hydrographic survey objectives in the future.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mahasiswa mampu mengetahui konsep dan aplikasi survei hidrografi 2. Mahasiswa memahami aspek teknis instrumen akustik bawah air dan gerak kapal 3. Mahasiswa mampu mendeskripsikan propagasi gelombang suara di kolom air

Module objectives/ course learning outcomes	4. Mahasiswa mampu memahami konsep dan menghitung cepat rambat gelombang suara di kolom air 5. Mahasiswa mengetahui faktor-faktor yang mempengaruhi propagasi gelombang suara di kolom air 6. Mahasiswa mengenal konsep Multispektral Multibeam Echosounder 7. Mahasiswa mampu menjelaskan mengenai pasang surut dan pengaruhnya terhadap survei hidrografi 8. Mahasiswa mengetahui mengenai Underwater Acoustic Positioning beserta aplikasinya *1. Students are able to know the concept and application of hydrographic survey* *2. Students understand the technical aspects of underwater acoustic instruments and ship motion* *3. Students are able to describe the propagation of sound waves in the water column* *4. Students are able to understand the concept and calculate the speed of sound waves in the water column* *5. Students know the factors that affect the propagation of sound waves in the water column* *6. Students are familiar with the concept of Multispectral Multibeam Echosounder* 7. *Students are able to explain about tides and their effects on hydrographic surveys.* 8. *Students know about Underwater Acoustic Positioning and its applications*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2	✓	✓										
CLO.3	✓											
CLO.4								✓				✓
CLO.5			✓									
CLO.6				✓			✓					
CLO.7			✓									
CLO.8							✓					

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan	• Teori dan konsep dalam survei hidrografi • Aplikasi survei hidrografi dalam berbagai bidang dan

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keperluan
- Aspek teknis instrumen akustik bawah air
- Ship's motion dan Transducer Mounting
- Konsep propagasi gelombang suara di kolom air
- Faktor-faktor yang mempengaruhi propagasi gelombang suara saat akuisisi
- Perhitungan kecepatan gelombang suara di kolom air
- Konsep dan aplikasi Multispektral Multibeam Echosounder
- Pasang surut dan perannya terhadap survei hidrografi
- Cara kerja dan aplikasi Underwater Acoustic Positioning

- *Theories and concepts in hydrographic surveying*
- *Application of hydrographic surveys in various fields and purposes*
- *Technical aspects of underwater acoustic instruments*
- *Ship's motion and Transducer Mounting*
- *Concept of sound wave propagation in the water column*
- *Factors affecting the propagation of sound waves during acquisition*
- *Calculation of the speed of sound waves in the water column*
- *Multispectral Multibeam Echosounder concept and application*
- *Tides and their role in hydrographic surveys*
- *How Underwater Acoustic Positioning works and application*

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Pembelajaran dan Persyaratan Ujian
Study and examination requirements and forms of examination

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<table>
<tr><th>Rencana Evaluasi</th><th>Bobot
Weight</th></tr>
<tr><td>Tugas 1
Assignment 1</td><td>10%</td></tr>
<tr><td>Tugas 2
Assignment 2</td><td>5%</td></tr>
<tr><td>Tugas 3
Assignment 3</td><td>10%</td></tr>
<tr><td>Evaluasi Tengah Semester
Mid Semester Exam</td><td>20%</td></tr>
<tr><td>Tugas 4
Assignment 4</td><td>10%</td></tr>
<tr><td>Tugas 5
Assignment 5</td><td>15%</td></tr>
<tr><td>Tugas 6
Assignment 6</td><td>10%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Exam</td><td>20%</td></tr>
</table>

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</tr>
</table>

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	1. IHO., 2020. IHO Standards for Hydrographic Survey. 6th Edition. Special Publication 44. Monaco 2. Poerbandono., Djunarsjah, E. 2005. Survei Hidrografi. Bandung: Refika Aditama 3. IHO., 2005. Manual On hydrography. Monaco. International Hydrographic Beareau 4. Lurton, Xavier. 2010. An Introduction to Underwater Acoustic: Principles and Applications: Second Edition. Perancis. Praxis Publ.

15.Oseanografi Fisik Lanjut / *Advanced Physical Oceanography*

Nama modul *Module name*	**Rekayasa Survei Hidrografi** *Applied Hydrographic Survey*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185914
Mata kuliah *Course*	Rekayasa Survei Hidrografi *Applied Hydrographic Survey*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Danar Guruh Pratomo
Dosen *Lecturer*	Danar Guruh Pratomo
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: 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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Mata kuliah ini berfokus pada pengenalan dan pemahaman mengenai proses fisik lautan dan keterkaitannya terhadap survei pemetaan di laut. Secara umum, pendekatan fenomena yang terjadi di

Description of Course	area pesisir seperti proses pantai maupun estuari dan fluktuasi muka air laut juga disampaikan dalam mata kuliah ini. Selain itu, dipaparkan pula berbagai instrumen untuk mengobservasi fenomena tersebut. Mata kuliah ini ditujukan kepada mahasiswa magister yang akan melakukan penelitian mengenai geomatika kelautan. Program pada mata kuliah ini baik berupa pemaparan materi, praktikum atau pemodelan, maupun penugasan lainnya akan mampu memberikan kesempatan kepada mahasiswa agar dapat berpikir kritis terhadap fenomena fisik di lautan beserta pengaruhnya terhadap hasil akuisisi data kedalaman menggunakan instrumen akuistik untuk pemetaan laut. *This course focuses on the introduction and understanding of the physical processes of the ocean and their relationship to mapping surveys at sea. In general, approaches to phenomena that occur in coastal areas such as coastal processes and estuaries and sea level fluctuations are also presented in this course. In addition, various instruments to observe this phenomenon are presented. This course is intended for master students who will conduct research on marine geomatics. Programs in this course in the form of material presentations, practicum or modeling, as well as other assignments will be able to provide opportunities for students to think critically about physical phenomena in the ocean and their effects on the results of depth data acquisition using acoustic instruments for ocean mapping.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mahasiswa mampu memahami konsep dan teori dari proses fisik di lautan atau oseanografi fisik 2. Mahasiswa mampu menjelaskan keterikatan antara laut dan atmosfer 3. Mahasiswa mengetahui proses dan parameter distribusi panas di lautan (ocean heat budget) 4. Mahasiswa memahami berbagai parameter fisik lautan yang berhubungan dengan propagasi gelombang suara di kolom air 5. Mahasiswa mampu menjelaskan konsep pengaruh parameter fisik lautan terhadap cepat rambat gelombang suara 6. Mahasiswa mampu mengetahui tentang dinamika air laut 7. Mahasiswa mengetahui proses terbentuknya pantai beserta geomorfologi pesisir

Module objectives / course learning outcomes	8. Mahasiswa mengetahui instrumen yang digunakan dalam observasi fenomena fisik di lautan 1. *Students are able to understand the concepts and theories of physical processes in the ocean or physical oceanography* 2. *Students are able to explain the relationship between the ocean and the atmosphere* 3. *Students know the process and parameters of heat distribution in the ocean (ocean heat budget)* 4. *Students understand the various physical parameters of the oceans related to the propagation of sound waves in the water column* 5. *Students are able to explain the concept of the influence of ocean physical parameters on the speed of sound waves* 6. *Students are able to know about the dynamics of seawater* 7. *Students know the process of the formation of the coast along with coastal geomorphology* 8. 9. *tudents know the instruments used in observing physical phenomena in the ocean*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2		✓	✓									
CLO.3				✓								
CLO.4	✓											
CLO.5				✓								
CLO.6		✓										
CLO.7			✓	✓								
CLO.8							✓					

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan	• Pengantar oceanografi dan oseanografi fisika • Pengaruh atmosfer terhadap lautan • *Ocean heat budget* • Temperatur, salinitas, densitas • *Harmonic sound speed* • Dinamika air laut: *current, ocean wave, tides* • Proses pantai: *coastal process* dan pasang surut • Estuari • Instrumen observasi parameter oseanografi

<table>
<tr><td>Content</td><td>

Shelf processes-stratification
R.O.F.I's
Introduction to oceanography and physical oceanography
The influence of the atmosphere on the ocean
Ocean heat budget
Temperature, salinity, density
Harmonic sound speed
Ocean dynamics: current, ocean wave, tides
Coastal processes: coastal process and tides
Estuary
Instruments for observing oceanographic parameters
Shelf processes-stratification
R.O.F.I's

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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>Tugas 1
Assignment 1</td><td>20%</td></tr>
<tr><td>Tugas 2
Assignment 2</td><td>10%</td></tr>
<tr><td>Tugas 3
Assignment 3</td><td>15%</td></tr>
<tr><td>Evaluasi Tengah Semester
Mid Semester Exam</td><td>25%</td></tr>
<tr><td>Tugas 4
Assignment 4</td><td>5%</td></tr>
<tr><td>Evaluasi Akhir Semester
Final Exam</td><td>25%</td></tr>
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<tr><td>Media yang digunakan
Media employed</td><td>Classical teaching tools with white board and power point presentation</td></tr>
<tr><td>Daftar Pustaka
Reading list</td><td>

Stewart, R.H., 2000. Introduction to Physical Oceanography. Department of Oceanography
Sahala Hutabarat dan Stewart M. Evans. 2008. Pengantar Oseanografi. UI Press
David Tolmazin. 1985. Elements of Dynamic Oceanography. Springer, Dordrecht
John H. Simpson dan Jonathan Sharples. 2012. Introduction to the Physical and Biological Oceanography of Shelf Seas. Cambridge University Press
Matthias Tomczak. 2000. Introduction to Physical Oceanography
Matthias Tomczak. 2000. Shelf and Coastal Oceanography.

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16. Aspek Geodetik dalam Penentuan Hukum Laut / *Geodetic Aspects of Law of the Sea*

Nama modul *Module name*	**Aspek Geodetik dalam Penentuan Hukum Laut** *Geodetic Aspects of Law of the Sea*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185916
Mata kuliah *Course*	Aspek Geodetik dalam Penentuan Hukum Laut *Geodetic Aspects of Law of the Sea*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Danar Guruh Pratomo
Dosen *Lecturer*	Danar Guruh Pratomo
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 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*	
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2												
CLO.3												
CLO.4												
CLO.5												
CLO.6												
CLO.7												
CLO.8												

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	
Pokok Bahasan *Content*	Tuliskan seluruh mater
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	Bobot *Weight*

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	Tuliskan seluruh pustaka

17.Pengembangan Pertanahan / *Cadastre and Land Management*

Nama modul *Module name*	**Pengembangan Pertanahan** *Cadastre and Land Management*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185917
Mata kuliah *Course*	Pengembangan Pertanahan *Cadastre and Land Management*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Filsa Bioresita
Dosen *Lecturer*	Filsa Bioresita
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Pada mata kuliah ini, mahasiswa mempelajari tentang pengembangan pertanahan terkait konsep dan prinsip

Description of Course	pertanahan, landasan hukum/regulasi, pengadaan, administrasi, manajemen pertanahan, serta sengketa pertanahan. *In this course, students learn about land development related to land concepts and principles, legal/regulatory basis, procurement, administration, land management, and land disputes.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	1. Mampu menjelaskan konsep dan prinsip pertanahan. 2. Mampu menjelaskan landasan hukum/regulasi yang berlaku di Indonesia terkait pertanahan. 3. Mampu menjelaskan tentang sengketa atau permasalahan pertanahan di Indonesia maupun negara lain. 4. Mampu menganalisa permasalahan terkait pengembangan pertanahan di Indonesia. *1. Able to explain land concepts and principles.* *2. Able to explain the legal basis/regulations that apply in Indonesia related to land.* *3. Able to explain about land disputes or problems in Indonesia and other countries.* *4. Able to analyze problems related to land development in Indonesia.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2		✓										
CLO.3			✓									
CLO.4			✓		✓							

Mata kuliah wajib prasyarat *Mandatory prerequisites*	Sistem Informasi Geografis dan Sistem Administrasi Pertanahan *Geographic Information System and Land Administration System*
Pokok Bahasan	Konsep sistem informasi pertanahan, hubungan antara sistem informasi pertanahan dengan pengelolaan dan administrasi pertanahan, peran data dan informasi dalam pengambilan keputusan pembangunan pertanahan, jenis data spasial dan tekstual dalam pengelolaan pertanahan, teori basis data, teori model basis data, metode perancangan sistem informasi ,

<table>
<tr><td>Content</td><td>aplikasi sistem informasi, contoh dan demo mengenai beberapa aplikasi sistem informasi pertanahan.

Land information system concept, relationship between land information system with land management and administration, the role of data and information in decision making of land development, type of spatial and textual data in land management, database theory, database model theory, information system design methods, the application of information system, example and demo regarding several land information system applications.</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>Presentasi
Presentation</td><td>20%</td></tr>
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Mid Semester Exam</td><td>25%</td></tr>
<tr><td>Tugas Kelompok
Team based task</td><td>25%</td></tr>
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Final Exam</td><td>30%</td></tr>
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Media employed</td><td>Classical teaching tools with white board and power point presentation</td></tr>
<tr><td>Daftar Pustaka
Reading list</td><td>1. Aronoff, S, 1989. “Geographic Information System : A Management Perspective”. WDL Publications, Ottawa, Canada
2. Burrough, P.A & McDonnel, R.A, 1998. “Principles of Geographical Information System”. Oxford University Press Inc, New York
3. Burrough, P.A, 1996. “Principles of Geographical Information System For Land Resources Assessment”. Oxford University Press Inc, New Yor
4. Budi Harsono, Hukum Agraria Indonesia, Himpunan Peraturan-peraturan Hukum Tanah, Jembatan, Jakarta, 1986.
5. Hermanses,R., Pendaftaran Tanah di Indonesia, Jembatan, Jakarta.</td></tr>
</table>

18.Sistem Informasi Perpajakan / *Tax Information System*

Nama modul *Module name*	**Sistem Informasi Perpajakan** *Tax Information System*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185918
Mata kuliah *Course*	Sistem Informasi Perpajakan *Tax Information System*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Filsa Bioresita
Dosen *Lecturer*	Filsa Bioresita
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Pada mata kuliah ini berfokus pada merancang Sistem Pendukung Keputusan berbasis TIS yang membantu

Description of Course	dalam pengumpulan, perhitungan, pemantauan dan pemeliharaan data untuk pajak properti melalui Visualisasi Data dan Analisis Spasial yang mencakup: 1) Kerangka Analisis Spasial 2) Identifikasi perencanaan pajak 3) Peta dan grafik dinamis interaktif untuk membantu tren visualisasi dan pemantauan.4) Izin penggunan bangunan dan integrasi pajak properti untuk membawa properti ke jaringan pajak dan meningkatkan pengumpulan data. 5) GUI yang menggabungkan dan membawa semua sistem dalam satu platform. *The course focuses on designing a TIS based Decision Support System that aids in the collection, calculation, monitoring and maintenance of records for the property tax department through Data Visualization and Spatial Analysis. It includes: 1) A Spatial Analysis framework 2) Tax planning identification tool 3) Interactive dynamic maps and graphs to aid with visualization and monitoring trends.4) Building Use (BU) permission and property tax integration to bring properties to tax net and increase collection. 5) A GUI combining and bringing all the deliverable to a single platform.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	1. Mampu menjelaskan prinsip dan komponen sistem informasi. 2. Mampu memahami pengetahuan teori dalam bidang perencanaan perpajakan. 3. Mampu memahami sistem informasi perpajakan di era digital. 4. Mampu mendemonstrasi, evaluasi, analisa informasi geospasial terkait perpajakan. 5. Mampu mendemonstrasi dan mempresentasikan purwarupa sistem informasi perpajakan secara offline atau online. *1. Able to explain the principle and component of information system.* *2. Able to understand theoretical knowledge in the field of tax planning..* *3. Able to understand the tax information system in the digital era.* *4. Able to demonstrate, evaluate, and analyze geospatial information related to tax planning.* *5. Able to demonstrate and present a prototype of a tax information system through online or offline.*

CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓										
CLO.2		✓										
CLO.3			✓									
CLO.4			✓									
CLO.5							✓					

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Tuliskan seluruh mater
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	**Bobot** ***Weight***
Review Pengembangan Perpajakan *Review the development of tax planning*	10%
Presentasi Aplikasi SIP *Present the applications of TIS*	20%
Membuat dan presentasi SIP sederhana *Create and present a basic SIP*	30%
Evaluasi Tengah Semester *Mid Semester Exam*	20%
Evaluasi Akhir Semester *Final Exam*	20%

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	Tuliskan seluruh pustaka

19.Sistem Administrasi Perpajakan / *Tax Adminstration System*

Nama modul *Module name*	**Sistem Administrasi Perpajakan** *Tax Administration System*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185919
Mata kuliah *Course*	Sistem Administrasi Perpajakan *Tax Administration System*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Bangun Muljo Sukojo
Dosen *Lecturer*	Bangun Muljo Sukojo
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Mata kuliah ini mendeskripkan baik secara teori, norma dan praktek perpajakan, sehingga matakuliah ini

Description of Course	didesain untuk membahas tentang dasar – dasar perpajakan yang meliputi filosofi pajak, pajak dalam perspektif administrasi publik, nilai nilai administrasi public dalam perpajakan, pengetahuan dasar tentang perpajakan dan ketentuan umum dan tata cara perpajakan serta pengetahuan tentang pajak dan retribusi daerah di Indonesia. *This course describes both the theory, norms and practice of taxation, so this course is designed to discuss the basics of taxation which includes tax philosophy, taxes in the perspective of public administration, values of public administration in taxation, basic knowledge of taxation and general provisions and taxation procedures and knowledge of local taxes and levies in Indonesia.*
Capaian Pembelajaran / *Course Learning Outcomes*	1. Mampu menjelaskan tentang konteks administrasi perpajakan dalam administrasi negara, teori, konsep, dan pengertian pajak serta paradigma perpajakan. 2. Mampu menjelaskan bagaimana kebijakan dan sistem perpajakan Indonesia dan ketentuan umum & tata cara perpajakan. 3. Mampu menganalisa mengenai pajak penghasilan, obyek pajak Bentuk Usaha Tetap (BUT), pajak final, dan pajak pertambahan nilai barang dan jasa, serta bea materai. 4. Mampu menjelaskan tentang kebijakan fiskal kaitannya dengan pajak. 5. Mampu memahami teori, konsep dan kebijakan yang berkaitan dengan pajak daerah & retribusi daerah.
Module objectives/ Course learning outcomes	*1. Able to explain the context of tax administration in state administration, theories, concepts, and tax definitions, also tax paradigm.* *2. Able to explain the Indonesian tax policy and system and general provisions & tax procedures.* *3. Able to analyze income tax, permanent establishment tax object (BUT), final tax, and value added tax on goods and services, as well as stamp duty.* *4. Able to explain about fiscal policy in relation to taxes.* *5. Able to understand theories, concepts and policies related to local taxes & regional levies.*

CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓										
CLO.2		✓										
CLO.3				✓								
CLO.4							✓					
CLO.5		✓										

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Tuliskan seluruh mater
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	**Bobot** ***Weight***
Presentasi *Presentation*	10%
Kuis *Cognitive Quiz*	30%
Evaluasi Tengah Semester *Mid Semester Exam*	20%
Tugas Kelompok *Team based project*	10%
Evaluasi Akhir Semester *Final Exam*	30%

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	Tuliskan seluruh pustaka

20.Sistem Pendaftaran Tanah / *Land Registration System*

Nama modul *Module name*	**Sistem Pendaftaran Tanah** *Land Registration System*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185920
Mata kuliah *Course*	Sistem Pendaftaran Tanah *Land Registration System*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Filsa Bioresita
Dosen *Lecturer*	Filsa Bioresita
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 theexamination regulations*	Minimum 80% kehadiran untuk mengikuti ujian tertulis *Minimum 80% attendance in this course in order to take the exams*
Deskripsi Mata Kuliah	Mata kuliah ini akan mengenalkan konsep penguasaan tanah (land tenure), pengertian umum dan

Description of Course	perkembangan pendaftaran tanah di Indonesia, Sistem Pendaftaran Tanah di Indonesia maupun di negara lain, FFP-LA, dan PTSL. *This course will introduce the concept of land tenure, general understanding and development of land registration in Indonesia, the Land Registration System in Indonesia and other countries, FFP-LA, and PTSL.*
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	1. Mampu memahami dasar hukum normatif tentang kegiatan pendaftaran tanah dan beberapa hal yang terkait. 2. Mampu memahami cara pembuatan peta pendaftaran tanah dan pendukungnya (gambar ukur, peta bidang). 3. Memiliki pengalaman membuat satu jenis produk kegiatan pendaftaran tanah yaitu peta bidang. 1. *Able to understand the normative legal basis regarding land registration activities and several related matters.* 2. *Able to understand how to make land registration maps and their supports (measurement drawings, field maps).* 3. *Have experience making one type of product for land registration activities, namely field maps.*
CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1		✓										
CLO.2			✓									
CLO.3			✓					✓				

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Pokok Bahasan *Content*	Tuliskan seluruh mater
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	

Rencana Evaluasi	**Bobot** ***Weight***
Presentasi *Presentation*	15%
Evaluasi Tengah Semester *Mid Semester Exam*	25%
Tugas Studi Kasus *Case Study Task*	30%
Evaluasi Akhir Semester *Final Exam*	30%

Media yang digunakan *Media employed*	Classical teaching tools with white board and powerpoint presentation
Daftar Pustaka *Reading list*	Principal: 1. Stoter, Jantien, 3D Cadastre In An International Context. 2. Fit For Purpose Land Administration, Enemark, S. et. Al. FIG Publication No. 60, 2014 3. Dale, P, and McLaughin, J. 1999. Land Administration. New York: Oxford University Press Supplementary: 1. Budi Harsono. 1986. Hukum Agraria Indonesia, Himpunan Peraturan-peraturan Hukum Tanah. Jakarta: Jembatan. 2. Rusmawar, W. 2012. Kadaster Masa lalu dan Masa Mendatang. Bandung: Penerbit ITB 3. Supriadi. 2007. Hukum Agraria. Jakarta: Sinar Grafika 4. Kurdinanto, Sarah. 2008. Pendaftaran Tanah. Bandung: Penerbit ITB.

21.Mitigasi Bencana / *Disaster Mitigation*

Nama modul *Module name*	**Mitigasi Bencana** *Disaster Mitigation*
Tingkatan *Module level*	Pasca Sarjana (S2) *Master Degree*
Kode *Code*	RM185924
Mata kuliah *Course*	Mitigasi Bencana *Disaster Mitigation*
Semester *Semester*	III (tiga) atau IV (empat) *III (three) or IV (four)*
Penanggung jawab mata kuliah *Person responsible for the module*	Amien Widodo
Dosen *Lecturer*	Amien Widodo
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 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***	

CPMK dan hubungan dengan CPL Prodi *Learning outcomes and their corresponding to PLOs*	

	PLO.1	PLO.2	PLO.3	PLO.4	PLO.5	PLO.6	PLO.7	PLO.8	PLO.9	PLO.10	PLO.11	PLO.12
CLO.1	✓											
CLO.2												
CLO.3												
CLO.4												
CLO.5												
CLO.6												
CLO.7												
CLO.8												

Mata kuliah wajib prasyarat *Mandatory prerequisites*	-
Capaian Pembelajaran / *Course Learning Outcomes* *Module objectives/ Course learning outcomes*	
Pokok Bahasan *Content*	Tuliskan seluruh mater
Pembelajaran dan Persyaratan Ujian *Study and examination requirements and forms of examination*	***4 asssessments:***

		Weight
		10%

1. ***Presentation - week 5***
2. ***Exam - week 8***

Media yang digunakan *Media employed*	Classical teaching tools with white board and power point presentation
Daftar Pustaka *Reading list*	Tuliskan seluruh pustaka